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Study on behalf of the
European Portable Battery Association (EPBA)

The collection of waste portable batteries in Europe in view of the achievability of the collection targets set by Batteries Directive 2006/66/EC

August 2013, **update December 2015**

Introduction

The collection of portable primary and rechargeable batteries in Europe is mandated by Directive 2006/66/EC which requires Member States to achieve a collection rate of 25% in 2012 and 45% in 2016.

The European portable power industry commissioned consultants Perchards/Sagis to carry out a study investigating and advising on the achievement of mandatory collection rates for portable primary and rechargeable batteries in EU Member States, plus Iceland Norway and Switzerland. In 2014 **and 2015**, EPBA commissioned an update of the study taking into account 2013 data.

The industry intends to use the study as a basis for dialogue with the European Commission, Member State Governments, their agencies and other stakeholders to highlight the limitations of the current regulations and practices as a basis for suggested improvements.

Methodology

The study's findings rely on primary research of publications of collection organisations (notably annual reports) and national authorities, supported by questionnaires and interviews with representatives from these organisations between May-12 to Aug-13. The consultants have attempted to explain the stated collection rates quantitatively by collecting hundreds of data points for each country and trying to identify correlations between them. This has proven challenging for several reasons: A) The sheer magnitude of variables with multiple interdependencies; B) Incomplete and incomparable historical data. (Prior to Batteries Directive 2006/66/EC there were no requirements at EU level to report on portable batteries, and if data were collected they were based on varying definitions); C) Diverging national terminology for key parameters of the schemes and organisations, such as collection sources; and D) Ongoing changes in national legislation and rapid development of scheme implementation as a result of the short time since the transposition of the Directive.

Data sources and accuracy

Accuracy of portable battery collection rates in this report: In the absence of the official collection rates that may be adjusted by statistically significant estimates[1], the collection rates used in this report are calculated using unadjusted POM and collection volume data released by member states and / or organisations. Where current data are not available, earlier data or estimates based on earlier years or partial data from organisations are used.

Per capita volume data: To allow for meaningful cross-country comparisons, it is necessary to use battery collection and POM data on a per capita basis. For consistency, this report only uses EUROSTAT population data to arrive at per capita volumes. Battery organisations and national authorities often use other data sources or data from a single base year. Thus per capita data in this report may vary slightly from those released nationally.

Sources for WEEE data: Eurostat EEE and WEEE data (2006 to 2010) are used for comparison purposes. (As regards batteries, Eurostat provides only one dataset for waste from all batteries 2004 to 2010 without breakdown into portables.)

Acknowledgements

The authors would like to thank the numerous individuals and organisations that have provided data and valuable input to this study. Any errors or omissions remain the responsibility of the authors.

[1] Batteries Directive 2006/66/EC requires member states to calculate the collection rate for the first time for the calendar year 2011 and report results of the four-year period 27 September 2008 to 26 September 2012 to the Commission by 26 June 2013. Commission Decision 2008/763/EC allows Member States to base their calculation of battery sales (POM, placed on the market) volumes on 'collected data or statistically significant estimates based on collected data'. For many countries these estimates may have a significant impact on the official collection rates, especially in those that did not have POM reporting procedures for batteries in EEE in place throughout the period 2009-2012 and those with high uncertainty about the reported collection volumes.

Terminology

'Scheme'	is used to refer to the overarching regime in view of the parties responsible for the management (consumer awareness, collection and treatment) of waste portable batteries.
'Scheme models'	can be distinguished by the parties held financially and/or organisationally responsible for waste battery management. For the purpose of this study, the following main scheme models are identified: 'State fund model', a 'Single organisation model' (also 'Environmental agreement model') and a 'Competing organisations model'.
'Organisation'	is used to refer to entities engaged in coordinating waste battery management and involved in assisting to fulfil producer responsibility obligations. Subject to the national context, 'organisations' may be referred to as 'compliance systems', 'producer compliance schemes', 'producer compliance organisations', 'collective schemes' or 'approved waste managers' which may be subject to licensing or approval requirements, restriction on their ownership, profit objective and business activities, etc.
'POM'	(Placed On the Market) refers to sales volumes of portable batteries that producers are obligated to report.
'Collection rate'	refers to the use of the calculation methodology of Directive 2006/66/EC which divides the collection volume in the current year by the average weight placed on market in current and two preceding years. If, due to unavailability of 3 years of POM data, only the current year POM is used, the text states 'collection rate on current year basis'.
'Batteries Directive'	refers to Batteries Directive 2006/66/EC.

Country short codes

Austria	AT	Greece	GR	Poland	PL
Belgium	BE	Hungary	HU	Portugal	PT
Bulgaria	BG	Iceland	IC	Romania	RO
Croatia	HR	Ireland	IE	Slovakia	SK
Cyprus	CY	Italy	IT	Slovenia	SI
Czech Republic	CZ	Latvia	LV	Spain	ES
Denmark	DK	Lithuania	LT	Sweden	SE
Estonia	EE	Luxembourg	LU	Switzerland	CH
Finland	FI	Malta	MT	UK	UK
France	FR	Netherlands	NL		
Germany	DE	Norway	NO		

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SUMMARY

Collection rate achievement 2012 and 2013, and outlook for 2016

In 2014, around 214,000 tonnes or an estimated 10.2 billion portable batteries were reported to have been placed on the market of the EEA plus Switzerland in 2014, while around 85,000 tonnes of waste portable batteries were reported as collected. This corresponds to a collection rate on a current year basis of 40%, up from 25% in 2010.

Batteries Directive 2006/66/EC requires 30 EEA member countries[2] to achieve minimum collection rates for portable batteries of 25% in 2012 and 45% in 2016.

- On the basis of the mostly unofficial data available for this study, the 25% collection rate was met by all but 3 countries in 2012 (CY, MT, RO). In 2013, the 25% rate was likely missed by three countries (CY, RO and new member state HR)**, and in 2014 by four (CY, EE, HR, MT).**

- **The 2016 collection rate of 45% has been exceeded by seven countries in 2014 (AT, BE, BG, LU, FI, SE, SK). In addition to these seven, three countries are expected to reach 45% in 2016 (DE, DK, NL). Twenty countries are projected to miss the 45% collection rate in 2016. Of these, ten may reach collection rates of below 35%.**

Concerns about the collection rate as measure of scheme performance

The Directive has achieved its overarching objective that collection networks for all portable batteries are available - or are in the process of becoming available - in all member states, and has triggered transitions that have harmonised the scope of national battery collection schemes and reduced distortions to competition in a number of countries. However, there remain several concerns about the relevance of the collection rate as a performance measure of these schemes. The most notable are:

- **Varying interpretations of the definition of 'portable' battery:** As batteries with a weight equivalent of around 20% of all portable batteries, predominately lead batteries, are difficult or impossible to distinguish as portable or industrial batteries at the POM stage, some organisations apply weight thresholds to facilitate the identification of portable batteries. These thresholds differ between countries. As a general rule, a higher weight threshold means that less non-lead batteries need to be collected to achieve a given collection rate. For example, a threshold of 2 kg would typically result in a 5-6% lead share of POM, and require a return rate of 21% of batteries of all other chemistries to reach a collection rate of 25%. Increasing the threshold to 5 kg could half the required return rate for all other chemistries. The interpretation challenges, including weight thresholds, and their potential to optimize collection rates and costs can be expected to increase with the growth of larger batteries for e-bikes and new battery applications.

- **Uncertain estimates of battery volumes POM embedded in EEE:** 37% of all portable, and 76% of rechargeable portable batteries by weight are placed on the market in EEE. The accuracy of reporting POM of embedded batteries has often been a challenge, notably in smaller countries with many self-importing retailers, as well as countries that base reporting on customs codes. In the absence of 'collected' (reported) POM data, Commission Decision

[2] 31 countries are signatories to the European Economic Area (EEA) agreement. However, EEA member **Liechtenstein** is part of the Swiss customs territory and as such subject to a large part of Swiss legislation, including waste legislation, and the Swiss producer responsibility organisations operate on its territory. **Switzerland** is not a member of either the EU or the EEA and thus under no obligation to follow EU policy. Switzerland has nevertheless adopted broadly similar rules on batteries as the EU and is included in this study for the sake of completeness.

2008/763/EC allows Member States to base their calculation of POM volumes on 'statistically significant estimates based on collected data'. Detailed data from several countries would be needed to improve the accuracy of national assumptions underlying such estimates, but these are not available.

- **Unaligned definitions of waste framework and batteries legislation complicates data collection and enforcement:** While the placing on the market volume of new batteries follows the distinction of 'portable', 'industrial' and 'automotive' batteries, the waste battery categories in the Waste Framework Directive's European Waste Catalogue distinguish only battery chemistries: thus, the licensing requirements for the waste batteries management activities (e.g. collection, transport, treatment) do not allow identifying *per se* those waste batteries that should count towards the portable batteries collection rate. This complicates the identification of collection volumes and provides a weak basis for enforcement.

- **Implausible amounts of lead batteries in waste battery collection volumes:** Given the material value and economical collection of lead industrial batteries (for which a natural market already exists) compliance organisations and member states need to carefully filter them out of portable battery collection reports. While in most countries the reported return rate for portable lead batteries is a plausible 100%, **higher return rates still persist in the UK, while the in other countries' data do not allow isolating the return rate of lead portable batteries.**

- **Trends delaying or preventing batteries becoming waste:** Studies from Belgium and the Netherlands indicate that at least 40% of batteries placed on the market do not become available for collection. While one reason for this is 'hoarding' by end-users, others are the increasing share of longer life rechargeable batteries and the export or unrecorded treatment of batteries in used EEE and WEEE (80% of rechargeable batteries are placed on the market in EEE). Studies suggest up to 40% of WEEE and used EEE may be improperly treated in or outside the country in which the EEE was originally placed on the market. As the portable batteries collection rate methodology includes batteries in EEE and WEEE, the uncertainty about cross border flows of used EEE and WEEE adds to the concerns about the relevance of the waste portable batteries collection rate as a performance measure of a waste portable battery collection scheme. The amount of waste batteries becoming available for collection as a percentage of POM can be expected to decrease in the future as improved battery technologies drive the widespread adoption of new applications (cordless power tools, garden equipment, small personal mobility, standby, energy storage).

Options to improve the relevance of the collection rate as a performance measure

To ensure that national collection rates reflect the actual performance of the waste portable battery collection schemes and to avoid distortion of competition within the Community these options would be ideally set at EU level.

Improving the distinction between portable and industrial batteries

Option A1: Excluding lead batteries from the calculation methodology of the collection rate. Lead batteries are the main cause of uncertainty regarding the current collection rates. Their exclusion is unlikely to lead to improper disposal due to their positive material value.

Option A2: Clarifying the term 'portable battery': To harmonise national interpretations of the term 'portable battery' and applied weight thresholds, the present definition could be complemented by a weight criterion. Furthermore, the term 'electric vehicle' in the industrial battery definition should be clarified.

Option A3: Requiring recycling efficiencies to be reported separately for portable batteries. This would allow reported collection rates to be verified by assessing the plausibility of the return rates.

More accurately reflecting the actual amount of waste batteries becoming available for collection

Option B1: Replacing POM with waste batteries 'available for collection' when calculating the collection rate. A methodological framework would need to be established for all member states to allow for a consistent identification of battery flows that are currently not accounted for (such as volumes of batteries that leave or enter a country in used or refurbished EEE or WEEE, that are treated with unreported WEEE) and the delayed waste generation effects due to battery and EEE market trends.

Option B2: Variations of POM base years and current year collection volumes: By the time the 45% target becomes effective in 2016, all countries will have fairly accurate and consistent POM data available for the past 5-6 years. To account for the trend towards rechargeable batteries with longer lifetimes, the POM base for later years could use 6-year POM averages to more accurately reflect the expiry of batteries.

Avoiding POM distortions and reducing administrative burden

Option C1: Excluding batteries in (W)EEE from the calculation of the collection rate: Batteries in EEE are typically disposed of in WEEE and thus do not find their way into the *collection points* for separate batteries[3]. Excluding batteries in (W)EEE from the calculation methodology would

a) remove key distorting waste battery flows (ex-, import of batteries in used EEE, WEEE)
b) reduce administrative burden, in particular also for SMEs and producers of B2B EEE
c) avoid double charging (EEE producers in most countries pay the same battery fees as producers of separately sold batteries. When integrated batteries are disposed of in WEEE, EEE producers finance two collection networks[4])
d) prevent two collection targets from being applied to parts of one and the same end-of-life product.

Option C2: Exempting small battery producers from reporting and financing obligations would reduce **t**he administrative burden on SMEs as well as battery organisations themselves. 2/3 of battery producers and importers contribute 1% - 2% of POM, respectively the revenue of battery organisations[5]. The impact on the schemes' functioning and the environment would have to be investigated.

Aligning the requirements with national circumstances

To avoid the likely underachievement of the 2016 collection rate, the following options could be taken to reflect specific national conditions in some countries:

Option D1: Applying derogated targets to at least the 10 member states that are subject to derogations under WEEE Directive 2012/19/EU[6]. It appears likely that most of these, as well as others including Cyprus, Estonia, Portugal, Spain and the UK, will find it difficult to reach the 45% batteries target in 2016.

Option D2: Encouraging post collection sorting of unsorted MSW (municipal solid waste) with a view to increasing the collection rate of recyclables, including batteries, can be an alternative to raising consumer awareness in countries where it is very low or so high that additional investments in consumer awareness do not raise the collection rate.

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3 The weight effect of replacement batteries on the two collection networks is neutral: If a battery in EEE is replaced and disposed of in the battery collection network before the EEE expires, the separately purchased replacement battery will be disposed of with the WEEE and add to the WEEE collection.

4 In this option, the obligation to finance the *treatment* of integrated batteries would need to be shifted to the EEE producer.

5 In the UK 67% of the over 1,500 registered portable battery producers in the UK contribute less than 1% of POM.

6 Lower interim and delayed final WEEE collection targets for BG, CZ, LV, LT, HU, MT, PL, RO, SL, SI: 40% from 2016 (rather than 45%) and the final rate (65%/85%) by 2021 (rather than 2019).

Review of battery collection scheme models and model transitions in the countries

Except for lead batteries, waste portable batteries have an overall negative economic value. Thus policy intervention is required to ensure schemes are set up to collect and treat waste portable batteries separately from other wastes if collection targets are to be achieved. Beyond requiring producers to finance the net cost of collection and treatment of waste portable batteries, the Batteries Directive leaves it to each member state to choose the operators and set the operating parameters of the battery schemes.

Three main scheme 'models' used by member states can be distinguished[7]:

- a 'single organisation model', used in seven countries (BE, CY, GR, LU, NL, NO, CH),
- a 'state fund model' used in two (IC, MT) and
- a 'competing organisations model' used in the remaining 21 countries.

Detailed requirements, not the model, determine scheme effectiveness

Available data suggest that any of the main collection scheme models can achieve high collection rates. Therefore detailed requirements on organisations, retailers and municipalities need to be investigated to identify drivers of scheme performance. Here are the main conclusions:

- Single organisations appear to outperform other models in terms of **awareness creation**. This may be due to higher communications spending[8], but also to a nationwide consistency of communication and collection containers that improves consumers' recall rates of the programme.

- When **minimum awareness creation measures** are legally required from organisations (BG, DK, EE, HU, LV, LT, PT), these tend to be more effective when quantifiable (e.g. minimum spending).

- The effectiveness of the **retailers' take-back obligation** is driven by additional parameters such as whether or not organisations provide retailers with collection containers (an important element of awareness creation); whether or not retailers can return batteries to municipal collection points; and the clarity of the retailers' obligation to provide information about the presence of collection points[9].

- There is a notable correlation between a **take-back obligation for municipalities** and the collection rate achieved. In nine countries (AT, BG, GR, IE, IC, LU, PT, SK, SI), municipalities are (or can be) held responsible for collection in addition to retailers[10].

- The collection rates in the two countries (DK, SE) which hold municipalities solely responsible for providing collection points (retailers are not obligated) show that '**alternative existing schemes**' can achieve comparable levels of collection[11].

- Requirements on competing organisations to ensure **coordination of collection networks** appear to be more effective than coverage requirements for each organisation (e.g. minimum number of collection points).

- The presence of higher[12] or interim **collection targets** on organisations creates an urgency to take action, especially when backed up by automatically enforced fiscal instruments (eco-taxes, fees).

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7 Note: When the Batteries Directive was published in 2006, 21 countries had a variety of different national collection schemes. The transitions between models triggered by the transposition of the Directive have been complex notably due to the Batteries Directive's explicit inclusion of batteries in EEE.

8 Financing aspects are not within the scope of this study

9 The effect of exemptions of small retailers in four countries (CZ, EE, PL, UK) was not assessed

10 A take-back obligation usually means that organisations do not compensate the obligated party for collection.

11 As allowed for in Article 8.1(b). In SE, the Directive's target was met in 2012 though probably not the 65% national target.

12 10 countries (BE, FR, DE, HU, LV, LT, NO, PL, PT, ES, SE) set earlier or higher collection targets.

Mitigating challenges of the competition model

The 'competing organisations model' faces a systemic challenge in implementing the two key success factors of waste portable battery collection: to provide nationwide sufficient conveniently-situated waste battery collection points[13] and to shape end-user behaviour through consistent awareness measures to dispose of waste batteries correctly.

To mitigate this challenge, the 21 countries using the 'competing organisations model' limit competition through licensing requirements (which usually involve the approval of an operational plan) or other measures. The following interventions can be identified:

- The obligation to operate the portable battery collection network is placed on municipalities (DK, SE), while competing organisations provide financing only.
- Approval to *operate* the waste battery collection network is granted to only one organisation, while all organisations provide financing (FI).
- The number of organisations is limited to two (FR) or organisations are assigned different geographic regions (IE).
- Legislation designates one organisation as the main organisation but allows competing organisations[14] to operate under largely the same requirements (DE).
- Organisations are required to join a 'coordination centre' to ensure nationwide coordination (AT, IT) through framework agreements with associations representing municipalities.
- Fiscal instruments (eco-fees, taxes) are applied so organisations can be fined for under-achievement of the collection target (BG, HU, LV, LT, PL, SK), but central coordination between organisations is not stipulated.
- In the remaining 7 countries with a 'competing organisations model', approved organisations compete without central coordination or fiscal enforcement instruments (CZ, EE, ES, PT, RO, SI, UK).

Conclusions about national scheme performance

In countries where the schemes' progress in rolling out or expanding existing battery collection networks has slowed before optimal coverage was reached, three market conditions can be identified: a malfunctioning market, a distorted market and an unaccelerated market (stagnant collection volumes). All three can occur in one country to varying degrees.

Improved distinction of portable batteries would largely remove the causes of malfunctioning and distorted markets. Challenges regarding stagnant or unaccelerated markets require introduction or fine-tuning of obligations on actors in the national collection scheme. In line with the principle of subsidiarity, such measures should be addressed at national level.

[13] At the end of 2012 the average collection point density in 26 countries from which data are known or can be based on substantiated estimates was one collection point per 690 residents (or 1.7 collection points per 1,000 residents).

[14] These systems are *de jure* individual systems but *de facto* service providers for many producers.

CROSS COUNTRY ANALYSIS

Collection rate achievement

Development of EEA wide reported POM and collection volumes

On the basis of the mostly unofficial data available for this study, **around 214,000 tonnes or an estimated 10.2 billion portable batteries were reported to have been placed on the market of the EEA plus Switzerland in 2014, while around 85,000 tonnes of waste portable batteries were reported as collected. This corresponds to a collection rate on a current year basis of 40%, up from 25% in 2010.**

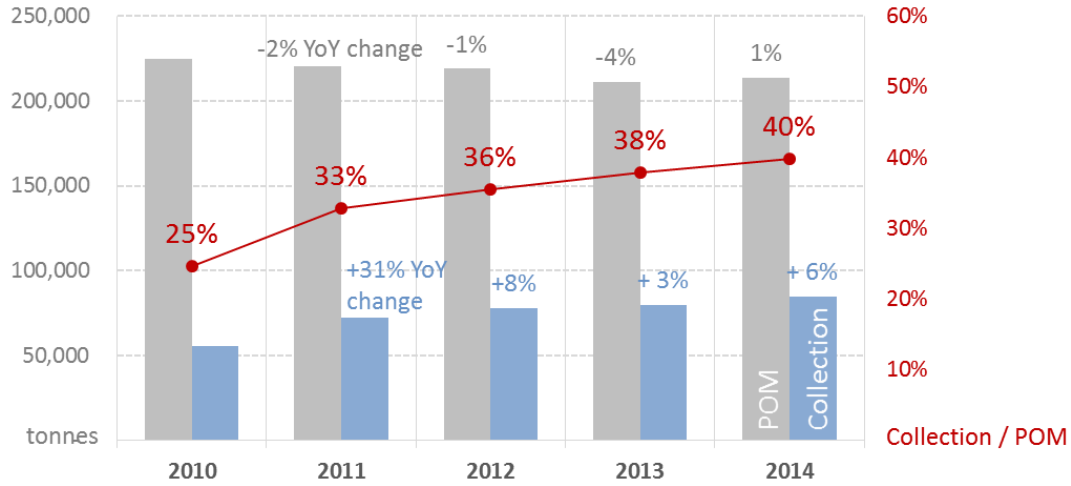


Figure 1: EEA + Switzerland, portable battery POM and collection tonnages 2010 – 2013

POM: Between 2010 and 2013 reported POM volumes declined by over 6% in terms of weight (from 430g per capita in 2010 to 402g in 2013). **In 2014, the downward trend reversed as POM increased by 1.1%.** In unit terms remained largely constant at around 19 units per capita [15].

Collection: Between 2010 and **2014,** reported collection of portable batteries increased by **54%** (from 107g per capita in 2010 to **161g in 2014**). The strong year-on-year growth in 2011 (+30%) declined to 3% in 2013 **but accelerated in 2014 (+6%)**. Few data are available about the number of units of waste portable batteries collected. Estimates from some countries suggest that in terms of units around 18% of batteries POM are collected.

Portable Batteries EEA + Switzerland	***Grams per capita*[16]**					***Units per capita***				
	2010	***2011***	***2012***	*2013*	***2014***	***2010***	***2011***	***2012***	*2013*	***2014***
POM	432	423	419	402	**405**	18.8	18.7	18.8	18.3	**19.3**
Collection	107	139	149	152	**161**	2.3	3.0	3.2	3.2	**3.4**
Collection / POM	*25%*	*33%*	*36%*	*38%*	***40%***	*12%*	*16%*	*17%*	*18%*	***18%***

*Table 1: EEA + Switzerland, portable battery POM and collection, gram and units per capita 2010 – **2014***

[15] 2002 - 2010 data suggests that POM increased by an annual average of 1-2% in unit terms (including declines after the 2008 financial crisis) and that the growth in numbers was driven by button cells (average weight of 2g) whose volumes have doubled since 2004. Currently button cells contribute about 25% of units and 2% by weight to POM.

[16] Population EEA + Switzerland 518, 520, 523, 525, 527 million in 2010, 2011, 2012, 2013, 2014 respectively.

Largely correlating to population size, six countries (DE, UK, FR, IT, PL, ES, NL) account for nearly 80% of POM and collection of portable batteries. Adding another six (SE, BE, AT, NO, CZ, CH) brings the total to over 90%:

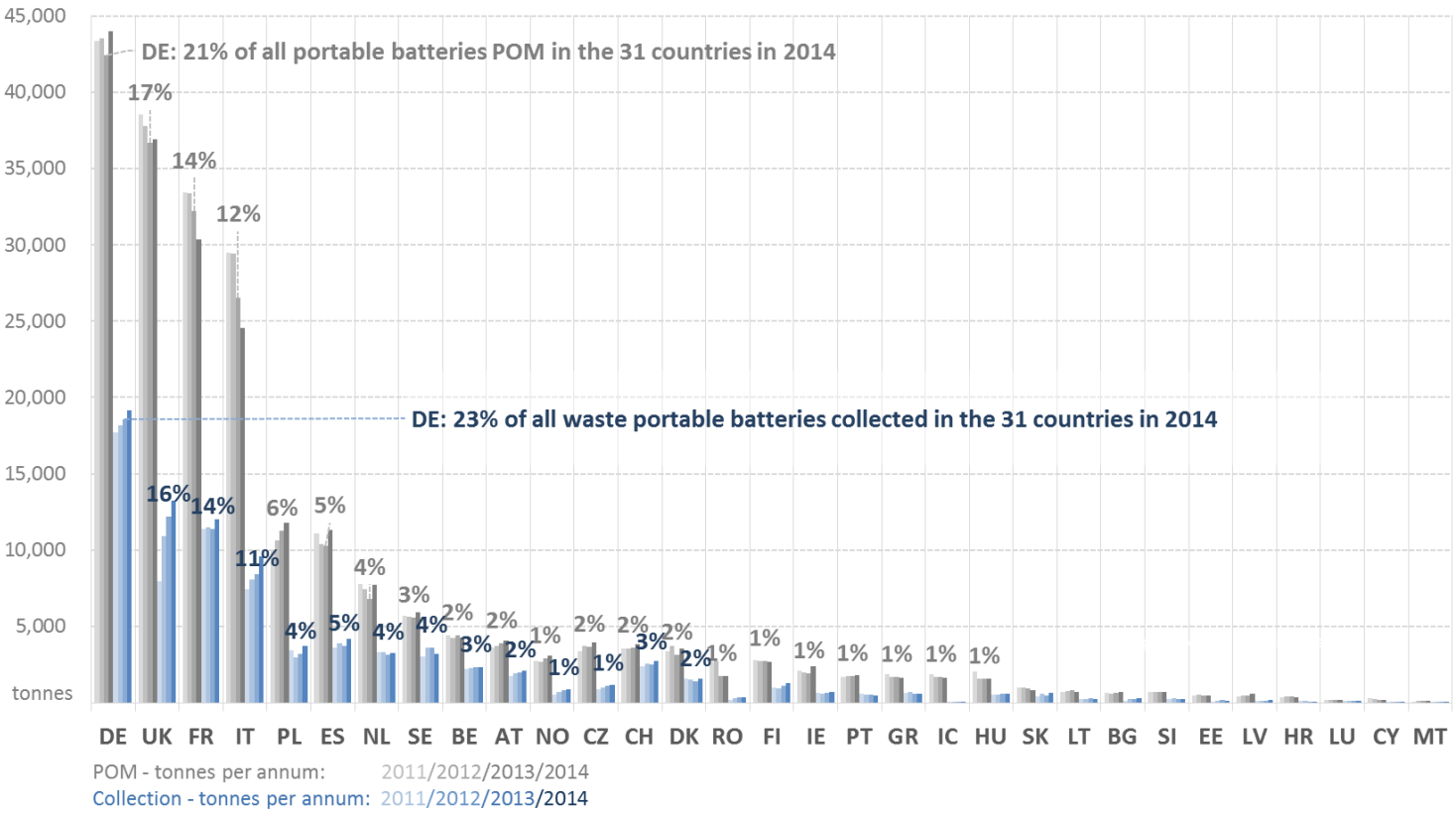


*Figure 2: EEA + Switzerland, portable battery POM and collection tonnages per country 2010 – **2014***

Current collection rates in EEA countries

Collection rates consistently above the 25% (2012) target in all except 3 - 4 countries

On the basis of the mostly unofficial data available for this study, the 25% minimum collection rate mandated by Batteries Directive 2006/66/EC in 30 EEA member countries[17] was achieved in all but 3 countries (CY, MT, RO) in 2012. In 2013, the rate was missed by CY and new member state Croatia (HR), probably missed by RO but far exceeded by MT. **In 2014, CY continued its upward trend but stayed below 25%, HR's rate did not change significantly while MT and EE fell back below 25%.**

7 EEA countries appear to have reached rates above 45% in 2014

These seven countries include 5 EEA countries that have consistently exceeded the 45% rate between 2011 and 2014 (AT, BE, SE, LU, SK) and two (FI and BG) which exceeded 45% for the first time in 2014.

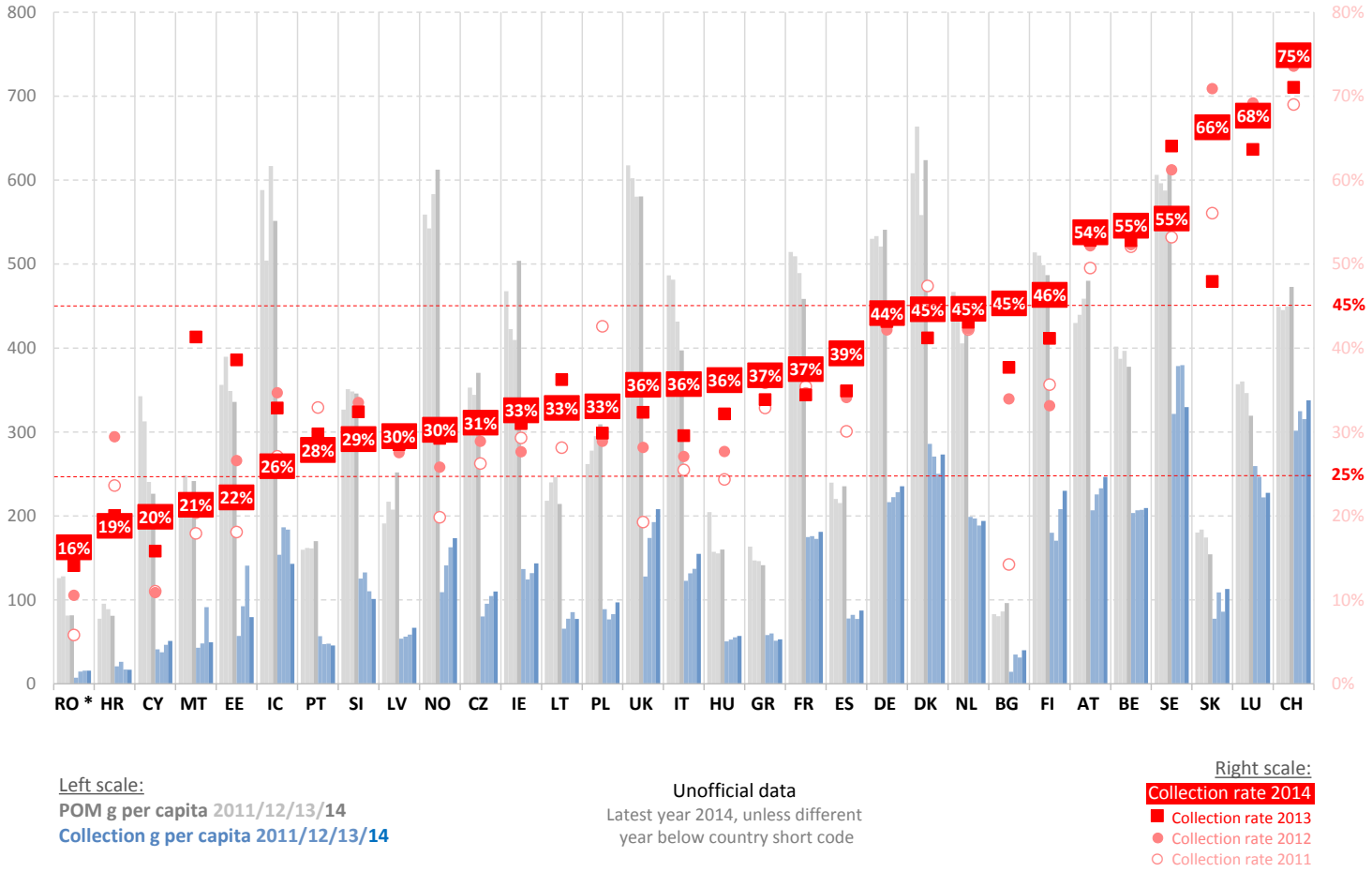


*Figure 3: EEA + Switzerland, portable battery POM and collection per capita and collection rates 2010 – **2014***

[17] 31 countries are signatories to the European Economic Area (EEA) agreement. However, EEA member **Liechtenstein** is part of the Swiss customs territory and as such subject to a large part of Swiss legislation, including waste legislation, and the Swiss producer responsibility organisations operate on its territory. **Switzerland** is not a member of either the EU or the EEA and thus under no obligation to follow EU policy. Switzerland has nevertheless adopted broadly similar rules on batteries as the EU and is included in this study for the sake of completeness.

About 2/3 of EEA countries unlikely to achieve a 45% collection rate in 2016

An extrapolation of the collection rates from 2012 to 2014 suggests around 20 of the 30 EEA area are unlikely to meet the 45% collection rate in 2016.

The straightforward extrapolation suggest that - in addition to 7 EEA countries that exceeded 45% already in 2014 (AT, BE, BG, FI, LU, SE, SK[18]) - 3 countries will reach rates just above 45% (DE, DK, NL). Of the remaining 20 countries,

- **4 are projected to reach rates of 40%-45% (ES, FR, IT, HU),**
- **4 to reach rates of 35%-40% (NO[19], PL, GR, IE),**
- **3 rates between 30% and 35% (CZ, LT, LV) and**
- **7 to remain below 30% (HR, IC, RO, EE, SI, PT, CY).**

The forecast has several limitations: The impact of the economic cycle on POM and strong annual variations of reported collection volumes could lead to substantially different rates in 2016. Moreover, collection rates in a small number of countries may fall if measures were taken to ensure that only waste batteries are counted towards the portable batteries collection rate that had been declared as 'portable batteries' when POM (which the UK has recently done). Additionally, national collection rates would vary if a common interpretation of the term 'portable battery' was applied[20].

Despite these limitations, the forecast strongly suggests that EPBA's position paper during consultation on the Directive in 2005, which considered the 25% target 'ambitious but achievable' but raised concerns about the achievability of the 45% target, remains valid.

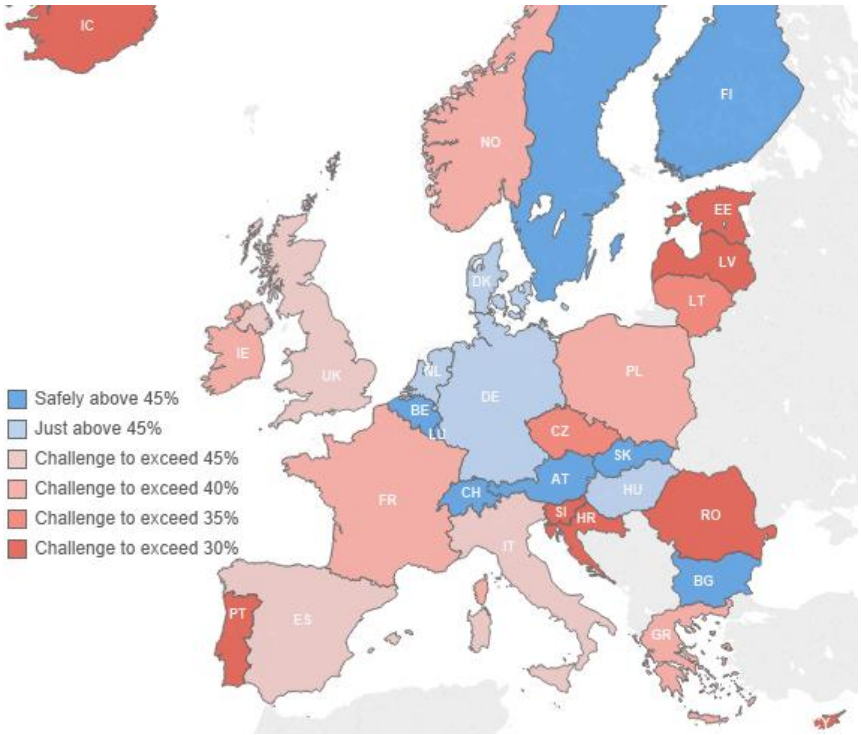


Figure 4: EEA + Switzerland, extrapolation of collection rates to 2016

18 **The SK collection rate is subject to uncertainties about embedded batteries' POM volumes.**

19 **The NO collection rate is subject to uncertainties about embedded batteries' POM and collection volumes.**

20 We estimate a harmonization of the weight thresholds for portable batteries currently applied in some countries would change national collection rates by up to +/- 3%.

Concerns about the collection rate as measure of scheme performance

The Directive's overarching objective – the availability of collection networks for all portable batteries – has been implemented in all member states. However, the battery volumes used in the calculation of the collection rate in several countries raise concerns about the relevance of the collection rate as a measure of scheme performance, most notably the disproportionate amount of lead batteries in waste portable battery collection volumes.

- Collection volumes in some countries appear to be inflated due to shortcomings of the definition of 'portable' battery. This is manifested in a **disproportionate amount of lead batteries in waste portable battery collection volumes** - up to 5 times the amount of portable lead batteries placed on the market: For example, eliminating these volumes would have probably reduced Poland's 2011 collection rate of 35% to around 25% and the UK's 2012 rate of 27% to around 13%. Collection of these lead batteries is driven by their abundant availability (twice the volume by weight of all portable batteries on the market), higher material value, lower collection costs and the impossibility at the collection stage of identifying whether these batteries were placed on the market as portable batteries.

- **Batteries not becoming waste in the country in which they were placed on the market:** Analyses in Belgium and the Netherlands suggest that less than 60% of portable batteries placed on the market actually become available for collection in these countries. This is probably due to rechargeable portable batteries (up to 40% of portable batteries POM) placed on the market in EEE[21] that are exported in second hand or refurbished EEE before the EEE becomes waste, 'secondary WEEE flows' (WEEE being illegally exported or treated but not reported) and WEEE containing batteries being shredded without prior removal of the batteries.

- **Uncertainty about POM volumes:** Differences in per capita POM volumes of portable batteries in countries with similar consumption patterns are probably due to varying interpretations of the term 'portable' battery as well as overriding battery legislation whose battery scope is based on customs tariff codes. The use of customs codes makes it difficult to distinguish between portable and industrial batteries and to accurately capture the weight of batteries incorporated into EEE.

[21] Of which 80-90% are incorporated into EEE.

The distorting effects illustrated here are discussed in the chapters '**Distortions in POM volumes'** and '**Distortions in collection volumes'**.

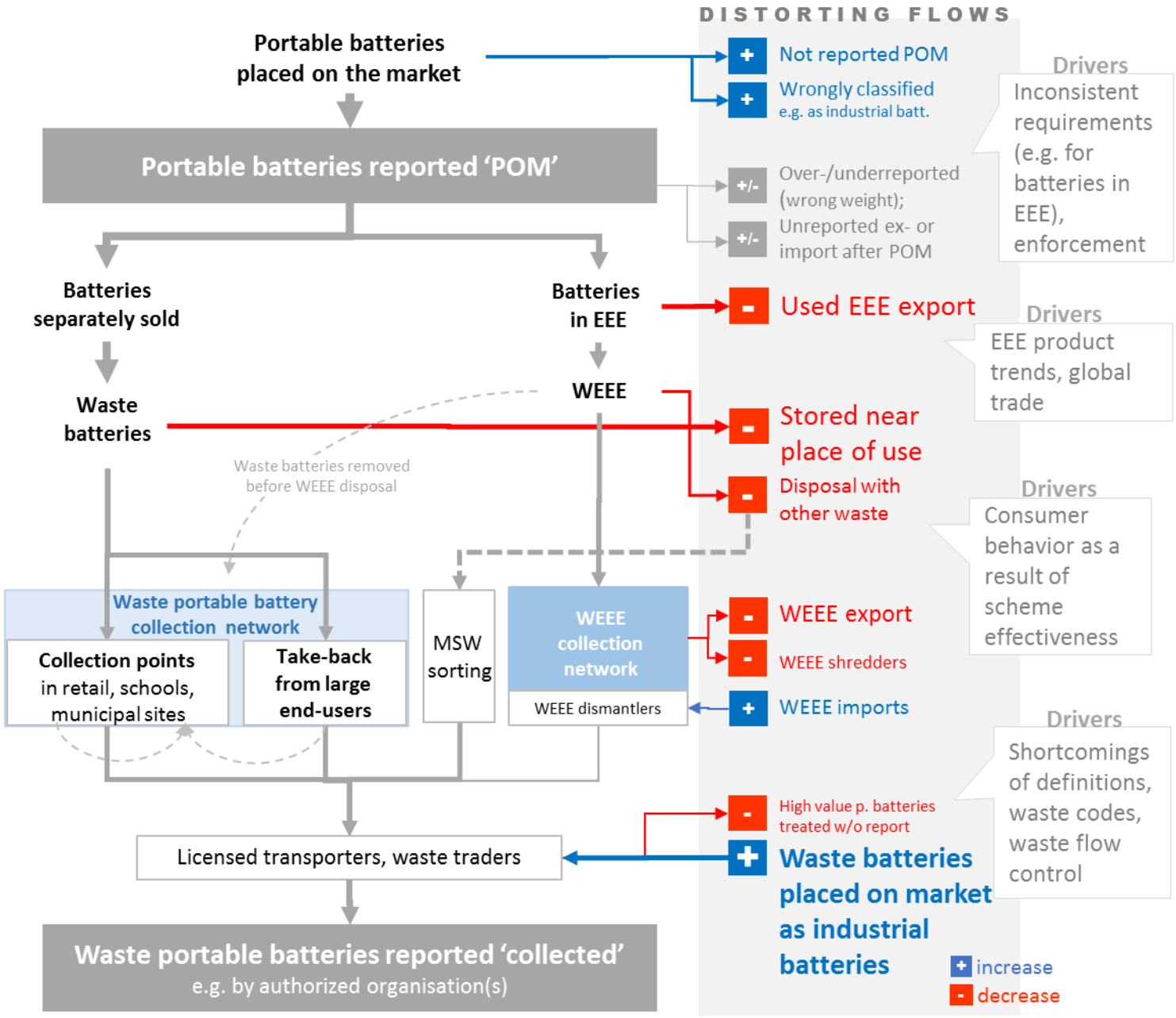


Figure 5: Schematic view of battery flows and distorting effects

Review of POM volumes by battery classifications

Annual sales of portable batteries – whose overall end-of-life value is negative – are around 18-20 units or 420-460g per capita per year. The average POM volume of industrial batteries – whose end-of-life value is positive – is estimated to be around 250-300% of that of portable batteries by weight, and less than 1% in unit terms. POM volume of automotive starter batteries is estimated at 600% of that of portable batteries by weight, and less than 1% in unit terms. As there is no collection target for industrial and automotive batteries, there is no direct obligation for member states to record POM volumes through reporting obligations for producers.

The dynamics and challenges of the waste portable battery collection market can be explained by reviewing the characteristics of all batteries being placed on the market in view of their distinction into portable, industrial and automotive batteries by Batteries Directive 2006/66/EC:

	Portable	***Industrial***	***Automotive (starter)***
Definition (according to Directive)	Sealed, can be handheld and is neither an industrial nor automotive battery	Designed exclusively for industrial or professional uses or is used in any type of electric vehicle	Used for automotive starter, lighting or ignition power
Examples of batteries or applications	Single charge (primary) batteries: 60-70% of POM by weight, 90% by units, 15% embedded; Rechargeable (secondary) batteries: 30-40% of POM by weight; 10% by units, 80% embedded;	Back-up power supply for hospitals, airports; Connected to solar, renewable energy applications; Lighting for outdoor public works (e.g. street maintenance) and mining; Non-starter batteries in trains, trucks, machinery; Hybrid vehicles, e-bikes, wheelchairs, forklifts, golf carts	Starter batteries
***Overall* material value of end-of-life product stream**	**NEGATIVE** except for a small fraction e.g. **Lead (2% - 3% of POM)**, small lithium-ion accumulators containing Cobalt	**HIGH** **Lead batteries** make up **95%** of POM; LOW (to negative) for remaining 5%	**HIGH** (100% lead batteries)
Key end-of life requirement	Collection schemes and targets	Landfill prohibition, No collection schemes[22], Take back requirement but no collection target	Landfill prohibition, Collection schemes, No collection target

Figure 6: Battery definitions, examples, key end of life requirements Reported POM volumes by battery definitions

[22] Directive 2006/66/EC: producers of industrial batteries shall 'not refuse to take back waste industrial batteries' from end-users

Reported POM volumes by the Directive's definitions

Portable batteries

Sales of portable batteries in Europe are on average 18-20 units or 420-460g per capita per year. There are wide variations between member states, ranging from about 100g per capita in Bulgaria to 700g in Norway. In weight terms, the market grew by an average of about 1-2% annually between 2004 and 2009, and appears to have declined by 1-4% per annum since.

The Batteries Directive's minimum collection rate requirement implies that member states must obligate producers to report POM at least by weight. However, most member states require producers to report POM by chemistry and/or other classifications. Unfortunately, these classifications differ between member states, which makes a comparison of POM data difficult, even when these detailed data are available.

Industrial batteries

Based on data from a number of countries[23] we assume average POM volume of industrial batteries to be 260% of that of portable batteries by weight, and less than 1% by units.

The Batteries Directive requires member states to register producers of industrial batteries but – as there is no collection target on industrial batteries – there is no direct obligation for member states to record POM volumes through reporting obligations for producers.

Automotive starter batteries

POM volume of automotive starter batteries is about 600% of that of portable batteries by weight[24], and less than 1% by units. As with industrial batteries, the Batteries Directive does not stipulate a POM reporting obligation.

2013 snapshot of battery shares, based on Data from BE and DE:		POM by units		POM by weight	
		g per capita	% of port. batteries	g per capita	% of port. batteries
Portable	TOTAL PORTABLE	20	*100%*	460	*100%*
Industrial	TOTAL INDUSTRIAL	0.12	*0.6%*	1,200	*258%*
Automotive starter		0.2	*0.9%*	2,760	*600%*

Table 2: Comparison of POM volumes of portable, industrial, automotive batteries

[23] This percentage varies between member states that record industrial batteries POM. The following examples are based on average POM of a number of years: 100 - 250% in DE, LT, PL, FI and to 250% to 400% in BE, BG, HR, DK, FR. An outlier is AT with 7%.

[24] This percentage varies between member states that record automotive starter batteries POM. Examples: Around 350% in DK and FR, from 550 - 700% in FI, FI and AT. Croatia is an outlier with over 1,600%.

POM volumes by additional battery classifications

Portable batteries

The analysis of long term POM data from a few countries (notably BE, CH, DE, FR) suggests the following shares and trends of key portable battery distinctions:

- **Battery weights and formats:** The smallest batteries, button cells with an average weight of under 3g per unit, account for 15-20% of all portable batteries POM in terms of units, but only 1-2% in terms of weight (their reported number of units has tripled since 2004). At the other end of the spectrum, portable batteries weighing above 1 kg account for only 0.3% in terms of units, but around 20% in terms of weight POM. In general, batteries with a weight under 100g account for over 90% of POM in unit terms, but only 35% of total weight POM.

- **Batteries POM in EEE:** Mainly as a result of the proliferation of mobile ICT devices, batteries POM in EEE (embedded batteries) represented over 1/3 of total portable batteries POM by weight, up from around 18% in 2004. For rechargeable batteries, however, the share of embedded batteries is more than double that (78%) of separately sold batteries.

- **Single-use batteries** account for about 90% of the batteries POM on a unit basis, and about 2/3 on a weight basis. By weight, standard size single-use alkaline and zinc carbon batteries account for almost all of these. Since about 2004, their volume by weight has decreased by about 20% (the number of units POM has been stable).

- **Rechargeable batteries:** The share of rechargeable batteries in all portable batteries has been continuously increasing (from 10-20% of POM by weight in 2004 to 30-40% in 2013; in unit terms from about 8% to 12%).

    - **Rechargeable lithium ion** batteries account for most of these. Their share of all batteries POM by weight has quadrupled since 2004 to about 20-25%. (German data show a growth of 4.5 times by weight and 1.3 times by units in that period). The trend is forecast to continue as lithium ion enables new applications and replaces other chemistries, notably nickel, in existing applications.
    - **Portable lead acid batteries:** POM of portable lead acid batteries (i.e. sealed lead acid batteries) appears to have been largely steady. Due to different national interpretations of the definitions of portable and industrial batteries the amount of lead batteries POM varies widely between countries. Ignoring the definitions, sealed lead acid batteries under 5kg POM are equivalent to about 0.4% of POM of portable batteries of all other chemistries and 20% in terms of weight.

- **Portable battery applications:** An estimated 30% of batteries POM by weight are used in IT equipment and consumer electronics, about 10-15% each are used in power tools and gardening equipment and toys. Emergency, storage and standby applications are currently estimated at 5-10% and increasing. Personal mobility applications such as e-bikes and wheelchairs are currently classed as using industrial batteries though they may use the exact same batteries that are defined as portable in other applications.

Industrial Batteries

Around 95% of industrial batteries are lead based. About 2-4% are lithium batteries for e-vehicles. The remaining 1% are speciality batteries, which vary widely in size and chemistry.

As batteries for e-vehicles count as industrial batteries, the total volume of industrial batteries and the share of lithium batteries are likely to increase significantly over the next decade.

Automotive starter batteries

Automotive starter batteries are essentially all lead based, with an average weight of above 15kg, and are easily distinguished from other batteries, though also used in other applications. There are mandatory deposit organisations in place in many countries to retrieve these batteries. Therefore the risk of automotive starter batteries distorting the collection rate of portable batteries is low.

2013 snapshot of battery shares, based on Data from BE and DE:		Avg. battery weight g / unit	POM by units		POM by weight		Share embedded		Share button cells	
			per capita	% of port. batteries	per capita	% of port. batteries	By units	By weight	By units	By weight
Portable batteries	**TOTAL PORTABLE**	23	**20**	***100%***	**460**	***100%***	**37%**	**37%**	**24%**	**2%**
	Single use Total	17	**18**	***89%***	**302**	***66%***	**32%**	**16%**	**23%**	**2%**
	Alkaline	19	13	*63%*	237	*52%*	23%	12%	8%	1%
	Zinc Carbon	37	1	*7%*	56	*12%*	50%	19%		
	Lithium	5	2	*11%*	10	*2%*	78%	78%	82%	54%
	Silver oxide	0.5	0.6	*3%*	0.3	*0%*	65%	65%	100%	100%
	Zink-Air	0.2	1.0	*5%*	0.2	*0%*	4%	22%	100%	94%
	Rechargable Total	73	**2**	***11%***	**158**	***34%***	**70%**	**78%**	**1%**	**0%**
	Lithium-ion	90	1	*5%*	90	*19%*	95%	89%	10%	0.3%
	Nickel-cadmium	215	0.1	*1%*	22	*5%*	81%	99%		
	Nickel-hydride	31	1	*5%*	33	*7%*	46%	55%	2%	1%
	Lead	799	0.02	*0.1%*	13	*3%*	40%	34%		
Industrial batteries	**TOTAL INDUSTRIAL**	10,085	**0.12**	***0.6%***	**1,200**	***258%***	**31%**	**14%**	**0.5%**	**0%**
	Lead total	13,915	**0.08**	***0.4%***	**1,132**	***246%***	**27%**	**11%**		
	Lead: < 1kg	745	0.01	*0.04%*	6	*1%*	19%	14%		
	Lead : 1 to 2kg	1,433	0.003	*0.02%*	4	*1%*	6%	7%		
	Lead: 2 to 3 kg	2,377	0.03	*0.2%*	79	*17%*	49%	48%		
	Lead: 3 to 5 kg	3,757	0.00	*0.01%*	11	*2%*	41%	39%		
	Lead: 5 to 10 kg	6,745	0.01	*0.03%*	46	*10%*	6%	6%		
	Lead: > 10 kg	35,720	0.03	*0.1%*	987	*214%*	9%	7%		
	Other chemistries	402	**0.04**	***0.2%***	**14**	***3%***	**38%**	**68%**	0.5%	0%
	Vehicle propulsion	59,164	**0.001**	***0.0%***	**42**	***9%***	**97%**	**100%**		
Automotive starter		15,000	**0.2**	***0.9%***	**2,760**	***600%***				

Table 3: Estimate of percentage shares of POM volumes by battery classifications, based on Data from several countries

Distortions in portable battery POM volumes

Varying interpretations of the 'portable' battery definition

As batteries with a weight equivalent of around 20% of all portable batteries, predominately lead batteries, are difficult or impossible to distinguish as portable or industrial batteries at the POM stage, some organisations apply weight thresholds to facilitate the identification of portable batteries. These differ between countries. As a general rule, a higher weight threshold means that less non-lead batteries need to be collected to achieve a given collection rate. The interpretation challenges, including weight thresholds, and their potential for optimising collection rates and costs can be expected to increase with the growth of larger batteries for e-bikes and new battery application.

A significant proportion of industrial batteries that are placed on the market separately (not embedded in EEE) is difficult or impossible to distinguish from portable batteries at the time of POM reporting, because their use is not known at the POM stage. For example, a producer selling lithium ion or lead accumulators may declare them as industrial batteries if he expects that the majority of them will be used in electrical vehicles. Nevertheless they may find their way into consumer applications and be disposed of as portable batteries.

The interpretation challenge is most acute for lead batteries, which has manifested itself in the different POM shares of portable lead batteries: 0% in GR and IC; up to 2% in BG, DK, ES, NL; 2-4% in BE, DE, FR, IE, LU and PL; 6-8% in SE and UK; 10-15% in EE and CZ. The differences are partly due to weight-based thresholds used for facilitating the distinction of portable and industrial batteries at the POM stage: Stibat (NL): portable battery < 1 kg; AFIS (GR): < 1.5 kg; Ecobatterien (LU): < 2 kg; from 2015: < 3 kg; ElKretsen (SE): < 3 kg; UK Environment Agency guidance: < 10 kg, **from 2016: < 4 kg.**

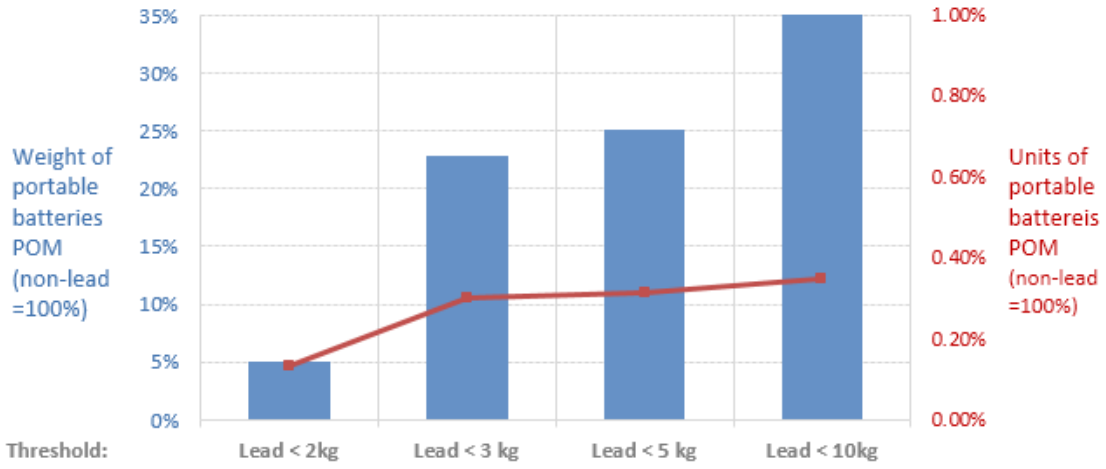


Figure 7: Estimated change in POM volumes in dependence of battery weight threshold

A low weight threshold may mean that private and small commercial end-users will have difficulties in disposing of batteries with a weight above the threshold. A high weight threshold, on the other hand, risks the costly collection of smaller batteries being neglected: Waste lead batteries are comparatively easy and profitable to collect so that a return rate of 100% for reported lead portable batteries is usually a given.

Assuming a 100% return rate for lead portable batteries POM, a 1% lead share of POM requires a return rate of 44.5% for batteries of all other chemistries to reach a collection rate of 45%. A 12% lead share in POM reduces the required return rate for all other chemistries to 37.5%:

Lead share of POM	*0%*	*4%*	*12%*
POM tonnage non-lead	**100**	**100**	**100**
POM tonnage lead	**-**	**4**	**14**
POM tonnage total	**100**	**104**	**114**
Coll. tonnage required to 45% rate	45	47	51
Plausible lead coll. tonnage (100% of POM)	**-**	**4**	**14**
Required coll. tonnage non-lead	**45**	**43**	**38**
Required return rate non-lead	*45%*	*43%*	*38%*

This effect is stronger at a lower collection target. In the example below, increasing the POM lead share from 4% to 12% reduces the required collection rate for all other chemistries from 22% to 15%.

Lead share of POM	*0%*	*4%*	*12%*
POM tonnage non-lead	*100*	*100*	*100*
POM tonnage lead	*-*	*4*	*14*
POM tonnage total	*100*	*104*	*114*
Coll. tonnage required to 25% rate	*25*	*26*	*28*
Plausible lead coll. tonnage (100% of POM)	*-*	*4*	*14*
Required coll. tonnage non-lead	*25*	*22*	*15*
Required return rate non-lead	*25%*	*22%*	*15%*

Table 4: Effects of lead POM share on required collection volume of all other chemistries

Uncertain estimates of battery volumes POM embedded in EEE

37% of all portable, and 76% of rechargeable portable batteries by weight are placed on the market in EEE. The accuracy of reporting POM of embedded batteries has often been a challenge, notably in smaller countries with many self-importing retailers, as well as countries that base reporting on customs codes. In the absence of 'collected' (reported) POM data, Commission Decision 2008/763/EC allows Member States to base their calculation of POM volumes on 'statistically significant estimates based on collected data'. Detailed data from several countries would be needed to improve the accuracy of national assumptions underlying such estimates, but these are not available.

Europe-wide, around 23,000 companies are registered with and report to the national battery registers. Especially in small countries, these are mostly trading companies or self-importing retailers with no resources or capacity to handle detailed product specifications that include battery weight and chemistry, particularly if the batteries are integrated into EEE.[25] As a result, organisations in several countries have a very limited ability to collect data about the weight of batteries in EEE.

The same applies to countries where fees are charged on the basis of units or customs codes (which often goes together). Harmonised customs tariff codes[26] are used in countries with state fund models (MT, IC, HR) and those applying eco-taxation as an enforcement instrument, as well as Norway where organisations assign billing to the customs authorities. Additional challenges arise as the customs code does not allow distinguishing portable from other batteries.

With few exceptions, organisations of any model tend to resist too much voluntary transparency, and the introduction of competing organisation schemes has amplified the trend to reduce transparency.

To improve the basis for estimates and allow assessing their plausibility, an obligation to report separately POM of separately sold batteries and batteries sold in EEE could be introduced.

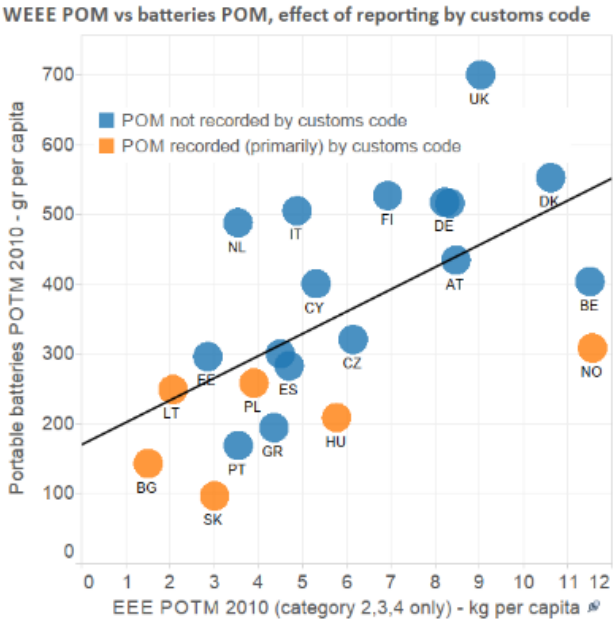


Figure 8: WEEE POM vs Batteries POM: Effect of the use of custom codes on POM volumes

The use of customs codes means that batteries integrated into EEE remain unreported as the product containing the integrated battery falls under the tariff code of the EEE. This is suggested by the chart above: Batteries POM per capita should closely correlate with EEE POM in categories 2, 3 and 4, as these categories contain or use most batteries. However, batteries POM remains below the trend line in countries (except LT) using customs codes to establish POM volumes.

[25] Perchards' experience with packaging reporting suggests that if data are not known, there is a tendency to over-report.

[26] Harmonised Commodity Description and Coding System (HS) 8506 Primary Cells (6 subgroups); 8507 Lead-acid Accumulators (6 subgroups).

Free-riders and small producer exemptions

Free-riders do not appear to distort POM volumes significantly as market surveillance by competitors and EEE producer associations ensures a relatively high degree of compliance among large producers. Most remaining free-riders can be assumed to be small companies that change overall POM volumes very little, while contributing disproportionate administrative costs to the organisations and themselves. Ecotrel (LU) calculated in 2007 that 64% of its members contributed less than 2% of revenue. In the UK, 67% of the 1,507 registered portable battery producers contribute less than 1% of POM[27] .

Other causes of POM distortions

Uncertainty about who is the 'producer' or 'importer' in the single market

Producers need to establish criteria in their EPR organisations that determine which products will be reported in which country. Unless he is both an importer and a distributor to final end-users, it is hardly possible for a producer to know in which country his products will eventually be sold to end-users, let alone where his product will arise as waste. The criterion most often used is the invoicing address of the buyer. However, the delivery address for the products might be in another member state again. The location of the final user of the batteries or EEE becomes totally untraceable for the reporting producers if the buyer takes the batteries into another country (after the producer placed them on the market). Quite often there is no mechanism in place to report these batteries as exported, and thus having been taken off the market (e.g. UK). This may affect reported POM volumes and cause waste management fees for a product to be charged twice, particularly in small member states in the EURO zone.

Import or export of batteries already placed on the market

While several countries have measures in place to account for EEE/batteries that are exported after having been placed on the market, in reality they are administratively difficult to fulfil if the EEE/batteries are not exported by the company that had placed them on the market in the first place, as a document trail needs to prove all steps in the process. For that reason, these measures are not often used.

Late reporting obligation

In some countries the obligation to report battery volumes in EEE came into force late, for example Norway (end 2012) and countries in Eastern Europe. Thus, the current collection rates may be lower than they would have been if the previous years included the volumes of integrated batteries, unless previous year volumes are adjusted by estimates.

Delayed producer awareness

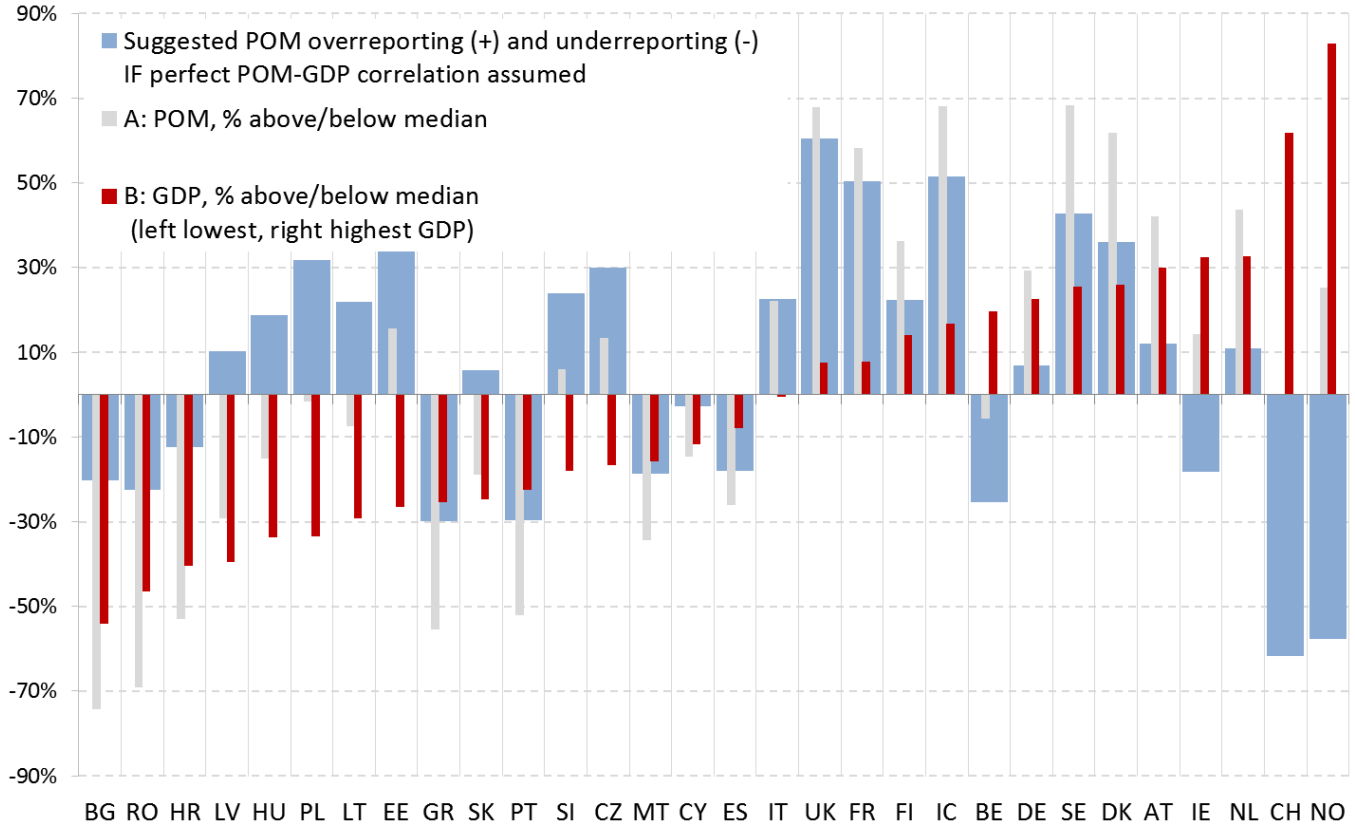
In countries where the obligation to report POM volumes of batteries integrated into EEE had been in place for some years, many EEE producers tended to become aware of their battery obligations only after the transposition of the WEEE Directive (2006-9) or even of the Batteries Directive. For example, the number of registered battery producers in Germany tripled in 2010 even though the obligation had been in place since 1998. Similarly in France, the number of registered portable battery producers almost tripled between 2008 and 2011 while the obligation had been in place since 2001.

[27] And therefore qualify as small producers that do not need to join a financing scheme.

Plausibility check: Correlation between battery POM and GDP

Noticeable differences in per capita POM can be observed in neighbouring countries with similar consumption patterns. Some of the suggested under-reporting can be explained by the challenges of reporting batteries. This applies for example to Greece, Croatia, Slovakia and Switzerland. Apparent over-reporting in UK may be related to an unclear interpretation of the portable batteries definition.

On a per capita basis, the reported weight of portable batteries placed on the market ranges from about 80 g in Bulgaria to over 600 g in Denmark, Sweden and the UK. To obtain a rough indicator of the plausibility of reported POM volumes, we assume that battery purchases are proportional to GDP[28] and compare the median deviation of a country's GDP with that of the reported battery POM.



Grey column: **2011-2014** portable batteries POM per capita, average annual deviation from median **(336 g)**

Red: **2011-2014** GDP per capita, average annual deviation from median

Blue = grey minus red: Percentage of batteries under/ over-reported if GDP and POM correlated perfectly

Figure 9: Correlation portable battery POM (avg. 2011-14) and GDP (2011-2014)

[28] Source EUROSTAT. We do not use purchasing power (PP) adjusted GDP as the price levels of batteries and EEE (mostly imported) vary less than locally produced services or food stuffs.

Distortions in in portable battery collection volumes

Unaligned definitions of waste and batteries legislation complicate data collection

> While the placing on the market volume of new batteries follows the distinction of 'portable', 'industrial' and 'automotive' batteries, the waste battery categories in the Waste Framework Directive's European Waste Catalogue distinguish only battery chemistries[29]: Thus, the licensing requirements for the collection, transport, sorting, storage and treatment of waste batteries *per se* do not allow identifying those waste batteries that should count towards the portable batteries collection rate. This complicates the collection of data underlying the collection rate and provides a weak basis for enforcement.

For organisations to separate waste battery collections into 'portable' and 'industrial' requires an additional process step that adds cost. Moreover, the risk of incorrect reporting is increased when waste batteries are not traceable to the point where they have been deposited by the end-user. This tends to be the case when collected waste batteries pass through one or several entities before being reported by a battery organisation.

The few organisations that disclose collection sources do not apply a common terminology. As a general rule, we assume that the risk of erroneous reporting increases with the share of waste batteries an organisation designates as 'companies' (which can comprise a large user known to the organisation as well as trading volumes of unknown origin) or 'other'. Data publicly available or received from organisations on the basis of confidentiality for this study show a large variance of waste battery sources with designations that indicate trading and may not be traced back to the place of disposal. These range from 0% to 65%, with an average of 17%. The percentage does not correlate with the age or model of a scheme.

[29] European Waste Catalogue:

Wastes not otherwise specified in the list: 16 06 01* lead batteries; 16 06 02* Ni-Cd batteries; 16 06 03* mercury-containing batteries; 16 06 04 alkaline batteries (except 16 06 03); 16 06 05 other batteries and accumulators; ** hazardous*

Municipal wastes: 20 01 33* batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries; 20 01 34 batteries and accumulators other than those mentioned in 20 01 33** hazardous*

Implausible amounts of lead batteries in waste battery collection volumes:

> Given the material value and economical collection of lead industrial batteries (for which a natural market already exists) compliance organisations and member states need to carefully filter them out of portable battery collection reports. While in most countries, the reported return rate for portable lead batteries is a plausible 100%, some implausible lead return rates were reported, notably in the UK, where the return rate for lead portable batteries was 478% and that of all other chemistries 5% in 2013 **(2014: 423% / 8%)**.

The dynamics and challenges of the waste *portable* battery collection market are explained by the characteristics of portable and industrial batteries chapter 'Review of POM volumes by battery classifications'. The challenge of correctly classifying collected batteries into portable and industrial categories is amplified by the following factors:

- The **ample availability** of waste batteries placed on the market as industrial batteries (by weight, their volume is around twice that of portable batteries)
- The **positive material value** of these batteries: around 95% of industrial batteries are lead acid batteries for which a natural market already exists.
- The **lower collection costs** of these batteries (by average weight, one industrial battery is 300 times heavier than a portable battery) and their general availability in more concentrated form at distributors or large aggregators.
- The **absence of a collection target for industrial batteries** leaves their producers with little incentive to have them returned, despite positive material value.
- **Dual use**, the trend for devices aimed at industrial users to be used by domestic users.

Distortions are usually only detectable when chemistries fractions are reported after the treatment of waste portable batteries, if such reporting is required under national waste legislation. The Batteries Directive itself does not require the 'recycling efficiencies'[30] to be broken down into the battery distinctions. Only a few input/output reports for portable batteries provide sufficient detail for review.

While in most countries, the reported return rate for *portable* lead batteries is a plausible 100%, some implausible lead return rates were published in Poland where the return rate in 2011 was close to 400%, but this was reduced to 105% by 2013. The lead batteries' effect on the UK's portable batteries collection rate was even more pronounced, where the collection rate for non-lead batteries was **8% in 2014**. Assuming a return rate of 100% for lead portable batteries reduces the overall collection rate from **35% to 15% in 2014**.

Collection rates UK, current year basis	***2010***	***2011***	***2012***	*2013*	***2014***
All chemistries	11%	21%	29%	33%	**35%**
Lead	55%	179%	295%	478%	**423%**
All except Lead	7%	6%	6%	5%	**8%**
All batteries, assuming Lead collected = Lead POM		14%	13%	11%	**15%**

*Table 5: UK portable battery collection rates 2010 – **2014**: Lead vs other chemistries*

[30] Recycling efficiencies (65% lead-acid, 75% nickel-cadmium, 50% all other waste batteries) apply summarily to all batteries and are consistent with (and less detailed than) the EWC code classification.

Distortions resulting from batteries in unreported WEEE and used EEE

> Studies suggest that up to 40% of WEEE and used EEE may be improperly treated in or outside the country where the EEE was originally placed on the market. As the portable batteries collection rate methodology includes batteries in EEE and WEEE, the uncertainty about cross border flows of used EEE and WEEE compounds concerns about the relevance of the waste portable batteries collection rate as a measure of the performance of the battery collection scheme.

A recent Commission staff working paper[31] notes that in a worst case scenario, WEEE illegally shipped out of the EU and WEEE separately collected but unreported and improperly treated 'could be assumed to represent around 41% of WEEE arising'. Eurostat data released in October 2012 show that in each year between 2007 and 2010, 10-14% of the reported WEEE collection volume can be attributed neither to reuse nor to treatment (table below).

Data from the few battery organisations that require producers to indicate separately the volume of batteries placed on the market in EEE, suggest that batteries in EEE contribute around 20% to 30% of portable batteries placed on the market[32]. The share of reported waste batteries removed from WEEE is usually much lower. Due to prior trading, organisations are often not able or willing to identify the share of waste batteries removed from WEEE in total collection volume. Public and confidential data from organisations suggest the share of batteries removed from WEEE is on average 7% in the 19 countries investigated, and ranges from 1% to 20%[33].

Exports of used EEE and 'illegal' exports of WEEE

The WEEE Directive impact assessment suggests that, according to various pieces of evidence, very large volumes of WEEE or used EEE are shipped out of the EU and therefore cannot be collected and recycled in the EU. Several investigations were made to detect such illegal shipments (UNU, Deutsche Umwelthilfe, Vanhouten and VROM). Due to the illegal nature of such shipments no data is available on overall volumes. A study in the UK showed that about 10% of WEEE transports were shipped illegally to non-OECD countries.

Legitimate exports of WEEE for treatment

Some member states export a large part of collected WEEE for treatment to other member states, in 2010 notably Norway 31%, Denmark 24%, Italy 21%, Ireland 20% and Hungary 17%, according to Eurostat data. The batteries contained in these volumes may not always be counted in the member states where they were placed on the market, but instead in the member state in which they are treated, which distorts the battery collection rate in both countries.

Unrecorded treatment

Batteries shredded with WEEE without prior removal: Though Annex II of the WEEE Directive (Recast Annex VII) requires batteries to be removed from WEEE prior to treatment, this is not always done in shredder treatment processes (and there seem to be few environmental reasons to do so). The effect of shredder treatment of small WEEE on the collection rate of batteries should be further investigated.

Batteries removed from WEEE and treated without reporting: Integrated accumulators often have positive material value and for that reason disappear at some stage of collection without being accounted for. This problem affects the reporting of all separately collected waste streams that contain expired products whose material value is higher than the cost of collection.

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31 A Commissions staff working paper SWD(2013) 268 (impact assessment accompanying a proposal to strengthen inspections and enforcement of Regulation (EC) No 1013/2006 on shipments of waste, July 2013)

32 Few comparable data are available on a country basis and the share of portable batteries POM volumes of portable batteries as a percentage of EEE POM show wide variations: On average, the batteries volume is 2.4% of EEE volume. In 2010 it ranged from 1% - 1.5% in SK, LU, PT, GR, BE to above 3% in SE, LT, EE.

33 On the basis of individual systems, shares are much higher for a few systems.

Examples are IT, mobile phones and computers in the WEEE stream, or cardboard, aluminium and mono material plastics in packaging waste.

For reference only:

EEE and WEEE volumes 2010	***All EEE categories***	***Categories with high battery share****
EEE put on the market, tonnes	9.6 million	3.3 million
WEEE collected, tonnes	3.6 million	1.6 million
… of which re-used	2%	0.3%
… of which treated in member state	77%	84%
… of which treated in other member state	5%	5%
… of which treated outside of EU	3%	3%
… of which not accounted as reuse and treatments**	**14%**	**9%**

Source: Analysis of Eurostat data 2010

** Categories 2, 3, 4 (small household appliances, IT and telecommunications equipment, Consumer equipment)*

*** Collection minus treatment minus re-use*

Market trends delaying or preventing waste generation

> Studies from Belgium and the Netherlands indicate that at least 40% of batteries placed on the market do not become available for collection, as a result of 'hoarding' as well as waste the increasing share of long-life rechargeable batteries and batteries in EEE are increasingly exported with the WEEE (80% of rechargeable batteries are placed on the market in EEE). The amount of waste batteries becoming available for collection as a % of POM can be expected to decrease in future as improved battery technologies drive the widespread adoption of new applications (cordless power tools, garden equipment, small personal mobility, standby, energy storage).

Belgian battery organisation Bebat has been in operation since 1996 and has achieved very high consumer participation (87%) and a dense collection network. Despite this, the collection rate has effectively hovered around 50% for the past 10 years.

By way of municipal solid waste (MSW) analysis, Bebat found that it collected 87% of batteries 'available for collection' in 2011. This number means that only 60% of batteries POM in Belgium become 'available for collection' there. Results of similar investigations by Dutch organisation Stibat translate into even lower rates (only around 42% of batteries placed on the market become available.

The reasons for at least 40% of batteries placed on the market not becoming available for collection in the same country are

- **hoarding of batteries by end-users** and the waste flows mentioned in the section on **unreported waste batteries in WEEE**,
- the **increasing share of rechargeable batteries**[34] which – due to their longer lives – become available for collection at a much later date than the primary batteries they replace.
- the increasing amount and fast replacement rates of **portable ICT devices** with rechargeable batteries which are **exported as second hand equipment** and will never become waste in the country where they were originally placed on the market.

We expect waste batteries becoming available for collection as a % of POM to decrease in future. As improved battery technologies[35] drive the widespread adoption of cordless power tools and garden equipment and enable new applications in these and other sectors (small personal mobility, standby and small energy storage)[36], we expect these trends – especially to larger sizes of rechargeable batteries – to continue until the innovation pipeline dries up and the market for these products is saturated, which appears unlikely before 2020.

Bebat argues that significantly increasing the collection rate would require disproportionate investments in marketing and logistics. For this reason, Bebat, in conjunction with EUCOBAT, would support a collection rate calculated on the basis of waste batteries available for collection ('waste batteries arising') rather than batteries 'placed on the market'.

34 Bebat data show that – not taking into account lead acid batteries – the share of secondary batteries as a percentage of all batteries POM increased from 25% in 2005 to 36% in 2011.

35 Driven by e-mobility and renewable energy storage applications

36 These application typically use heavier batteries than mobile devices but their unit sales are likely to be much smaller.

Review of waste battery collection scheme models

Scope and producer responsibility under the 1991 and 2006 Batteries Directives

A brief review of the scope and the producer responsibility requirements of the previous and current Batteries Directives helps to explain key implementation challenges.

Based on the environmental objectives of the European Treaty[37], Council Directive 91/157/EEC required member states to *'ensure the efficient organization of separate collection'* of batteries containing hazardous substances. Member states were to determine who should be organisationally and financially responsible for collection and treatment of these hazardous substance containing-batteries. Directive 91/157/EEC did not mention the principle of producer responsibility and did not set collection targets.

By 2006, 21 countries had a variety of different national schemes and instruments in place whose scope included the hazardous substance containing-batteries covered by Directive 91/157/EEC but often also batteries not containing hazardous substances.[38] All except two (DK, LU), involved producers (more in the chapter on **Transitions between models**).

As early as 1997, the Commission proposed a comprehensive revision of EU legislation on batteries *inter alia* with the rationale that the internal market would function better if there were a clear legal framework for national battery collection schemes. Directive 2006/66/EC was therefore given a secondary legal base[39] and aimed to achieve its internal market objective by

- extending the scope to all batteries and also explicitly to batteries incorporated in EEE,
- defining batteries as portable, industrial or automotive,
- introducing minimum collection targets for portable batteries only,
- requiring producers to *finance* 'any net costs arising from battery collection, treatment and recycling' while
- allowing member states to continue to determine the operators and operational parameters[40] of the collection schemes.

Recitals 19 and 28 explain the Directive's intent as regards the principle of producer responsibility: financing schemes for waste battery management should *'give effect to the principle'* considering that a *'flexible approach is appropriate … to reflect differing national circumstances and to take account of existing schemes, particularly [the WEEE schemes]'*.[41]

When countries began transposing the Batteries Directive, national WEEE legislation had just been introduced or revised to transpose WEEE Directive 2002/96/EC. The WEEE Directive's intent is *'to give maximum effect to the concept'* of producer responsibility as manifested in the requirement to enable not only collective but also individual producer responsibility.

37 Article 175(1) of the European Treaty on protecting the environment

38 Schemes whose mandated scope included only lead acid batteries, such as Italy's, are not counted here.

39 Article 95(1) of the European Treaty on ensuring the smooth functioning of the internal market and avoiding distortion of competition within the Community

40 Existing schemes can be maintained (Art 8.1) and alternatives are allowed to the distributor take-back obligation (Art. 8.2).

41 Batteries Directive Recital 19 and 28, WEEE Directive 2002/96/EC Recital (20).

Principal models of collection schemes

In all EEA countries, producers are currently held financially responsible for waste battery collection schemes. The organisational responsibility for the schemes, and the responsibility for decisions about which waste battery operations to fund, varies between member states. In the absence of a common terminology, we define the following four principal collection scheme models for the purpose of this study:

- State fund model
- Single organisation (environmental agreement) model
- Competing organisations model
- Model without organisations (producers fund battery collectors directly)

State fund model

> **Characteristics:** Producers are held only *financially* responsible for the costs of waste battery collection and treatment through payments of fees to a designated waste management fund or through taxation. The organisational responsibility for waste battery management and for the decision about which waste battery collection operations to fund, resides with a government controlled organisation or with municipal or regional authorities.

Origin: Municipal waste management has traditionally been the responsibility of municipalities, financed by local taxes. With the introduction of national legislation requiring separate collection of (at least hazardous) waste batteries, municipalities needed funding for this newly separate waste stream. The state fund model provides this funding through a 'product fee' or 'charge' or an 'eco contribution' or 'eco-tax' payable by producers placing batteries on the market, usually to a government-controlled fund. Most of the pre-Batteries Directive organisations in Central and Eastern Europe and also in Sweden and Denmark were based on this model.

Pros and cons: The strength of this model is relatively high legal certainty for producers. The tax/fee is usually charged by customs code and there is a high degree of enforceability when the fee is collected by tax or customs authorities. However, use of the customs codes reduces the accuracy of the collection rate as it does not allow distinction between battery types (portable, industrial) and makes capturing batteries in EEE difficult as they fall under the customs code of the EEE they are integrated in. Moreover, with many state funds there is the risk that the Government may decide to allocate collected funds to environmental programmes not related to the products from which the funds have been raised.

Variations of the state fund model

- **State fund financing diverse programmes:** The fund finances waste batteries but also other waste management-related projects of individual municipalities, regions or waste management firms. This model is still used in combination with other models to some extent in Slovakia and Lithuania.

- **State fund financing a single national battery programme:** State fund organisations that operate or finance a single national battery collection battery programme are currently used in Iceland and *de facto* in Malta.

Single organisation (Environmental agreement) model[42]

> **Characteristics:** In an 'environmental agreement' with government, the entire industry sector placing batteries on the market commits to *financing and organising* waste battery management through a single organisation. Typically, legislation is in place that would enforce taxation on battery producers in the event industry fails to meet mandatory collection targets.

Origin: Early battery and WEEE organisations in Western Europe were mostly based on this model (AT, BE, NL, CH).

Pros and cons: While the mandated monopoly position allows for a centralised and effective collection infrastructure and consumer awareness measures, single producer organisations – whether for WEEE, batteries or packaging – have been seen by competition authorities as shifting the balance of power among the stakeholders too much in favour of the single organisation and away from the waste sector and consumers, e.g. by not reducing fees to reflect actual costs. As all producers are charged the same fee, the incentive for producers to seek reductions is limited. The reductions of fee levels of WEEE organisations and some battery organisations over time suggests that only the introduction of competing organisations have changed this. The introduction of competing organisation schemes in neighbouring countries has also driven down fees in countries where an organisation retains monopoly status.

Competing organisations model

> **Characteristics:** Government authorises several organisations to assume the take-back obligation of producers. Organisations typically compete on the level of fees charged to producers, respectively on their costs of battery waste management to reach collection targets. Specific regulatory requirements such as mandatory participation of the organisations in a coordination body may be applied to ensure nationwide coverage of waste battery collection and to avoid distortions of competition.

Origin: Due to difficulties experienced by monopoly organisations in the 1990s[43], regulators, competition authorities and also producers supported legislation allowing competing organisations during the transposition of the WEEE Directive in 2004-8. During the subsequent transposition of Batteries Directive 2006/66/EC, many member states aimed to align battery organisations with WEEE organisations to reduce administrative burdens for producers and to enable synergies of the collection networks. In consequence, 21 of the 29 EEA countries now use a multi organisation model.

Pros and cons: While the competing organisation model ensures organisations operate "lean and mean", the competing organisation model has a few intrinsic challenges:

- **Nationwide coordination** is needed to optimise the effectiveness of consumer awareness measures and the provision of sufficient collection points for consumers, and to ensure the take-back of waste batteries from all entities that collect them without distorting competition between the organisations.
- The **control of waste battery flows:** The risk of inaccurately reported data flows increases with the number of supply and trading relationships between organisations, collectors and waste traders.
- Strong distrust between the organisations due to alleged **distortions of competition** in particular when
    - there are no legal requirements on organisations to make key information about their business model public, for example regarding the chemistries collected or basic information about the collection model,

[42] Depending on context and translation, this model has also been referred to as single collective organisation, monopoly organisation, designated system and in US states as 'state system' (whereby 'state' can refer to the coverage, not the control of the organisation)

[43] e.g. Germany's Green Dot packaging system, DSD

- producer-controlled non-profit battery organisations compete with organisations controlled by waste management companies which both supply and compete with organisations *[efforts to prevent such distortions, for example by requiring organisations to be non-profit, remain largely ineffective],*
- battery organisations have access to very different waste battery collection channels – and thus business models – due to their ownership structure (e.g. retailers) or commercial relationships (e.g. as reverse logistics partner to large battery users).

- The same lack of transparency requirements can make it **difficult, especially for smaller and medium-sized producers, to take an informed decision about which compliance organisation to choose**. Flooded with offers emphasising 'lowest compliance costs' it is difficult even for producers that invest considerable man-power in compliance to assess if an organisation's business model reflects the distribution pattern of his products.

Variations of the competing organisations model

National legislation aims to ensure fairness by setting collection targets for each organisation and enforcing fines for underachievement (e.g. BG, LV, PL) or by requiring them to participate in a single clearing house (AT, IT) or through a consultative commission (FR) to ensure coordination of the development of nationwide collection infrastructure and consumer awareness measures. However, in many member states no such measures are implemented consistently.

- **Competing battery organisations - enforcement of targets through eco-fees:** To ensure each organisation collects waste batteries in the same proportion as the new batteries its members place on the market, some countries (e.g. BG, LV, PL) apply the same collection target rate to each organisation. The previous eco tax/fee is converted into a penalty instrument that is applied when an organisation does not achieve the target. The organisation or the producer missing the target pays the tax/fee as a fine on the 'under-achieved' amount (difference between target and actual collection rate).

- **Competing battery organisations – fairness through other clearing mechanism:** While national legislation may or may not apply the Batteries Directive's collection target to each organisation or producer, only the six member states with an 'eco' fee/tax have an effective mechanism in place to sanction underachievement of the target, except for the outright withdrawal of an organisation's approval which is rarely used. As such, to ensure fairness and encourage collection, each organisation participating in the market should at least collect as much as the other organisations *pro rata.* To ensure this, all organisations are required to join a single clearing house or coordination body[44]. The main functions of this body are usually to

  - assign to each organisation collection responsibilities (e.g. geographically) proportionate to the volumes the organisation's members place on the market
  - ensure that the collectors, notably municipalities, can rely on a scheme taking back collected batteries
  - coordinate awareness creation measures (e.g. by collecting funds from each organisation for national campaigns)

  The clearing house usually prepares framework contracts with the national associations representing municipalities or regions. These contracts define the condition under which organisations receive waste batteries collected by municipalities (who may be legally required to collect or may collect voluntarily). In particular the framework agreements define subsidies for collection infrastructure measures undertaken by municipalities, uniform compensation rates for the waste batteries that municipalities hand over to the organisations (thus stabilising the market by preventing waste batteries being passed to the highest bidding organisation), or the terms under which municipal collection points accept waste batteries collected by retailers.

[44] In some countries the regulator assumes the role of clearing house, for example in Ireland, where the regulator allocates regional coverage for each of the 2 systems on a regular basis to reflect their market shares.

Model without organisations

Characteristics: Each producer finances authorised waste battery companies (collectors and transporters) directly to meet the collection targets imposed on him. There are no legal provisions for authorising organisations to coordinate battery waste management on behalf of producers.

Legally, this model is in place in Slovakia and Poland[45]. However, battery producers there comply through service providers that fulfil a similar role as collective organisations while the take-back obligation is retained by the individual producer.

[45] In Germany a variant of this model is used for WEEE: A central clearing house assigns WEEE take-back requests from municipal collection points to individual producers who in turn pay contracted waste management companies directly to fulfil the take-back request.

Before and after the Batteries Directive – transitions between scheme models

By 2006, 21 countries had a variety of different national schemes and instruments in place whose mandated scope included different types of hazardous and often also non-hazardous batteries.[46] 19 of these (all except DK, LU) involved producers:

- 9 single schemes (CZ, PT, ES, AT, BE, GR, NL, NO, CH)
- 7 state fund schemes (BG, HU, SK, IC, DK, SE, MT, LU[47])
- 3 competing schemes with state fund / eco-tax back up (LV, LT, PL),
- 2 competing schemes (FR, DE)

While the Batteries Directive stipulates that financing schemes give effect to the *'principle of producer responsibility'* it also recommends that *'a flexible approach is appropriate … to reflect differing national circumstances and to take account of existing schemes, particularly [the WEEE schemes]'*[48]. When countries began transposing the Batteries Directive, national WEEE legislation had been newly created or revised[49] to meet the WEEE Directive's mandate *'to give maximum effect to the concept of producer responsibility'* by enabling individual producer responsibility.

The Batteries Directive's explicit coverage of batteries in EEE amplified the complexity of its transposition into national law. The strong interest groups involved in shaping producer responsibility policy – municipalities, the waste sector, battery producers and now also EEE producers – made transitions between scheme models a challenge that often continues today:

- Single organisation schemes remain in place in BE, CH, GR, NL and NO and were newly introduced in CY.
- In AT, the single battery organisation became redundant as retailers were made responsible for returning batteries to municipal collection points from which producers finance them through competing organisations. In CZ a competing organisations scheme was introduced but the formerly single organisation remains dominant.
- The transition from state fund to competing organisations schemes with eco-tax enforcement has probably been the most complex. Two sets of legislation (fiscal and environmental) with different scopes and Ministerial authorities need to be introduced (BG, HU) or adjusted (HU), leading to frequent regulatory changes (LV, LT). This transition is the least advanced in SK where the dissolution of the fund model is under discussion.
- The remaining state fund schemes were maintained after much consideration in IC, maintained *de facto* due to a lack of available alternatives in MT, introduced in HR, maintained but restricted to financing collection by municipalities in DK and converted into a *de facto* single scheme in LU.
- Existing legislation on competing organisations was incrementally adjusted in DE and FR where over time fewer organisations have been authorised.
- Transition from single to competing schemes remains difficult in ES, because a key challenge – regional authorisations and waste reporting – has only recently been addressed, and in PT.
- In the absence of previous schemes, competing organisations were introduced in IE, SI and EE which achieved a good collection point density in a short time. The introduction of competing organisations in the UK which allowed organisations to choose how they collect waste batteries appears to have discouraged investment in the collection network. In RO comprehensive legal requirements have only been in place since 2012.

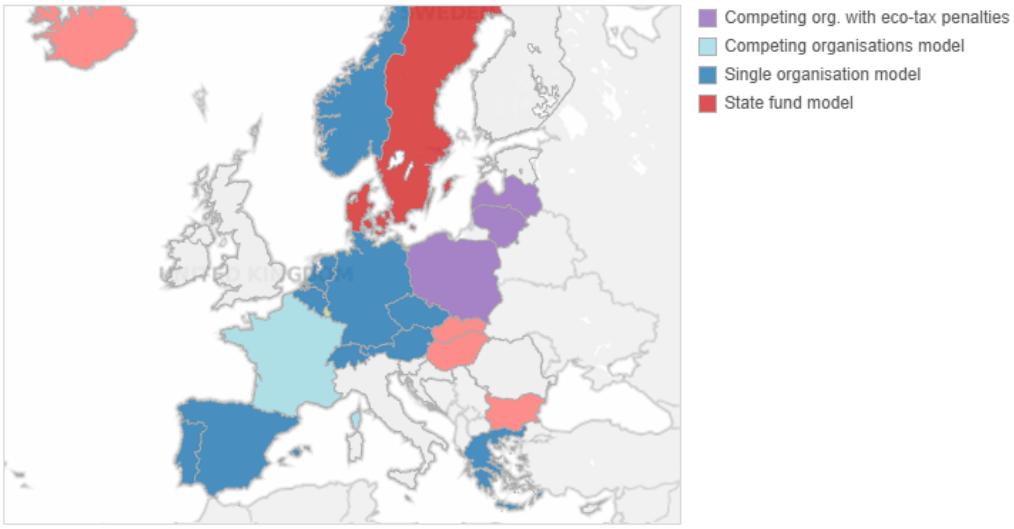
46 Schemes whose mandated scope included only lead acid batteries (such as Italy's) are not counted here

47 Luxembourg's scheme was operated and financed by the municipality; transposition made producers responsible for both

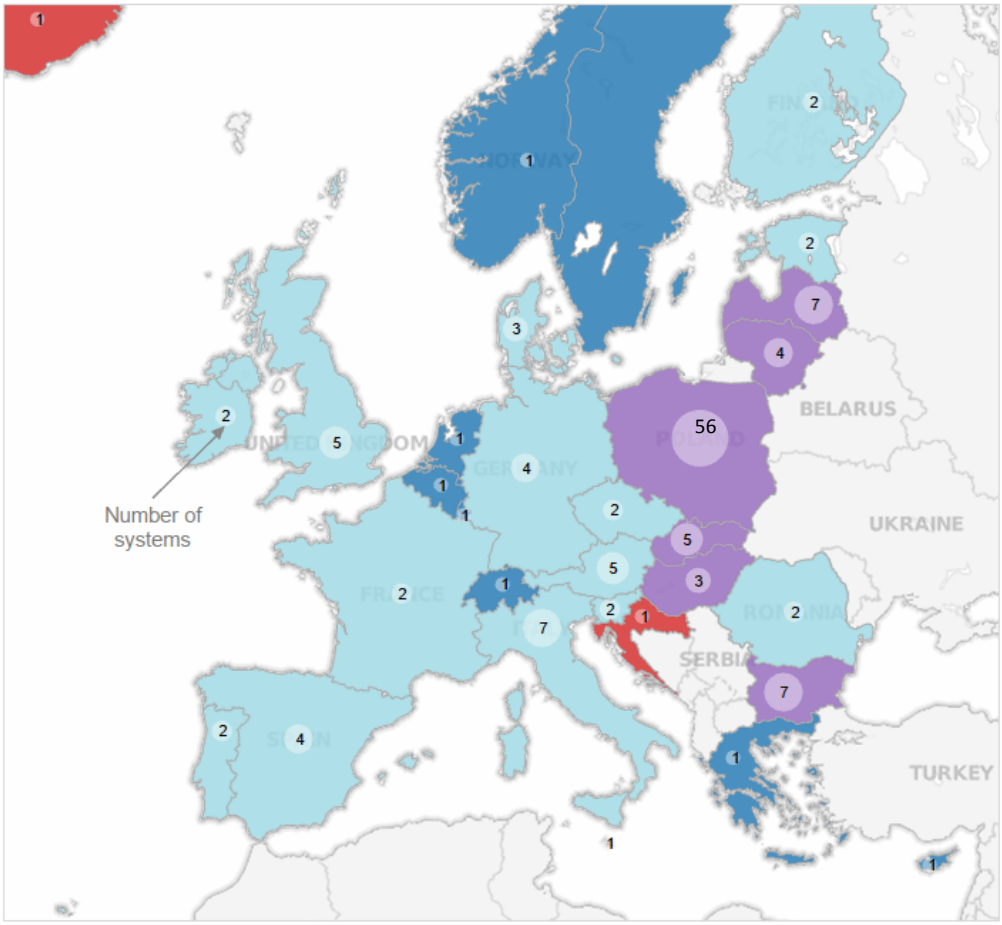
48 Batteries Directive Recital 19 and 28, WEEE Directive 2002/96/EC Recital 20

49 13 countries had nationwide WEEE schemes in 2005

Dominant scheme model 2006



Dominant scheme model 2014



Note: *National batteries legislation alone is often insufficient to determine a country's dominant de facto scheme model as market conditions or later regulatory intervention may for example mean that a competing organisation is legally but not practically possible. The maps above aim to take this into account. In the 31 countries investigated, there were about* ***112*** *portable battery compliance or similar organisations in* ***2014****.*

Note on Poland: *There are over* ***56 (2014)*** *waste battery collection organisations that offer compliance services directly to producers (new legislation will reduce this number from 2015).*

Figure 10: Dominant scheme models 2006 and 2014

Comparative performance of models in view of the collection rate

Achievability of the 45% target

Overall, the collection rates reported in countries with different models suggests that a 45% collection target can be achieved by any model. As one would expect, there is a correlation between the length of time separate collection has been in place and the collection rate being achieved.

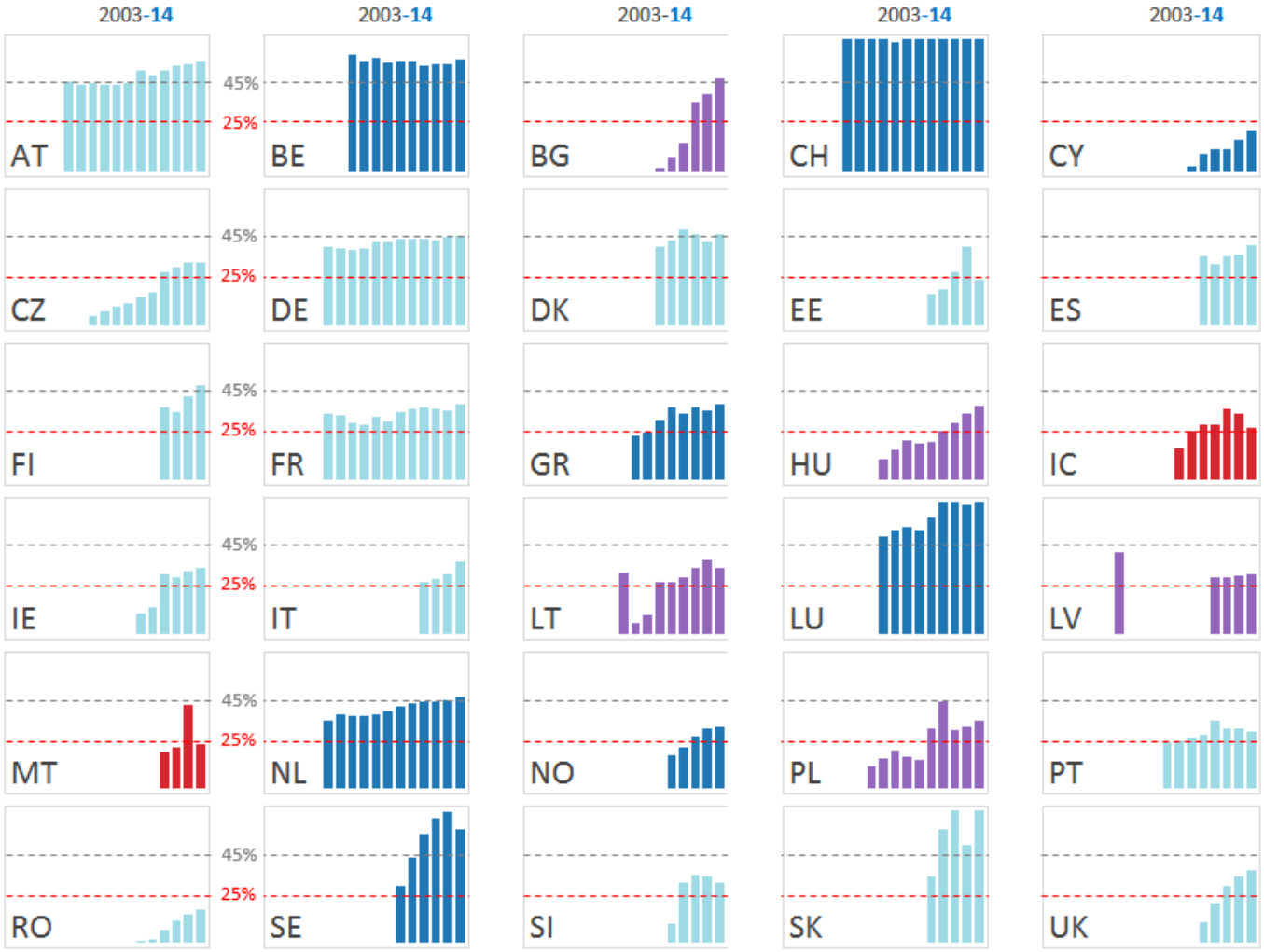
The collection rates reported in countries with competing organisations suggest no correlation between the degree of competition – expressed by the number of organisations (circle size) – and the collection rate.

Figure 11: Scheme models, collection rate and years of separate collection

Long term collection rates

Data from well performing organisations suggest that a strong increase in the collection rates often levels off after 3-5 years. Organisations that have achieved collection rates above 40% in the first few years usually find it difficult to maintain, let alone increase, this level.

Though some countries with schemes using competing organisations with eco-fee enforcement show very high recent collection rates (BG, LT, PL), rates for this model historically trail those of single organisations or schemes with competing organisations without eco-fees. This is probably due to the less advanced waste management infrastructure in eastern European member states where the model is used.



The graphs show that long term collection rates tend to plateau, often after 3-5 years. Graphs for many countries do not show collection rates of previous schemes as these are either unavailable or not comparable (e.g. applying only to certain chemistries). Nevertheless, current collection rates build on collection infrastructure and consumer awareness generated by the previous schemes.
Sources of the data sources are listed in the country sections of this report.

*Figure 12: Collection rates 2003 - **2014***

Collection scheme performance

Key success factors of collection schemes: A waste battery collection scheme's effectiveness in

- *communicating and shaping end-user behaviour* and
- *providing sufficient and convenient waste battery return facilities*

determines whether end-users will dispose of batteries correctly rather than 'hoarding' them near the place of use or disposing of them with other waste.

Consumer awareness and disposal behaviour

The results of consumer surveys suggest that the percentage of respondents aware of the need for separate disposal of waste batteries is typically around double the collection rate.

Surveys of consumer attitudes to waste battery disposal provide an indication of the amount of waste batteries hoarded or incorrectly disposed of. In Austria, Belgium, France, Netherlands and Switzerland – all of which already achieve a collection rate exceeding 35% – regular surveys have tracked consumer awareness of waste battery collection. While details of the surveys vary, common questions concern respondents' awareness of the need for separate collection as well as their actual disposal behaviour.

Unsurprisingly there is a gap between respondents' awareness of the need for separate disposal and their claimed disposal behaviour. The gap is significantly wider in the Netherlands and Austria than in Belgium and Switzerland.

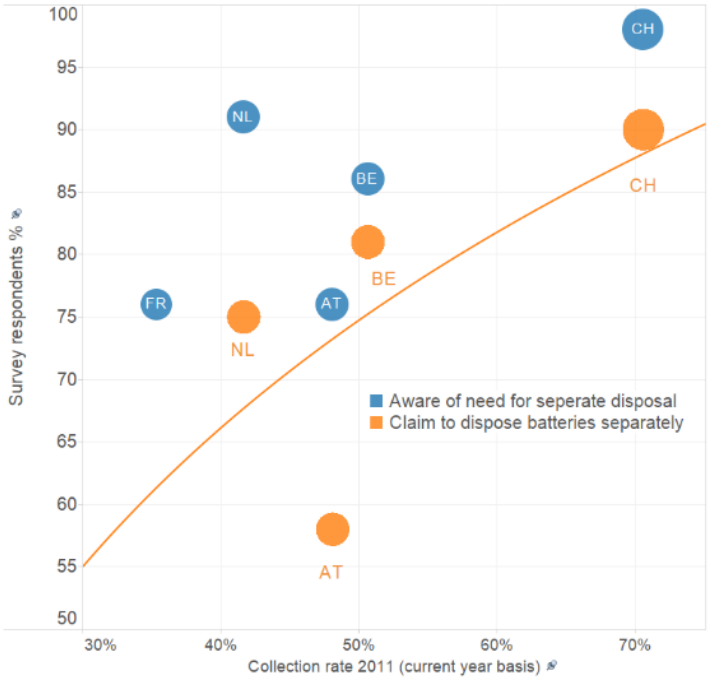


Figure 13: Consumer awareness & disposal claims and the collection rate

Sources of collection volumes

As a result of different collection network and business models, the origin of the volume of collected waste batteries varies widely.

Data from 24 countries that was either publicly available or received for this study from organisations on a confidential basis suggests that on average about 1/3 each of waste batteries are deposited at municipal collection facilities and in retail distribution, while the remainder derives mainly from large commercial users.

The municipalities' share can be as high as 90% (DK) where municipalities are obligated to collect but retailers are not. However, these percentages do not allow conclusions about where end-users dispose of batteries, as retailers may voluntarily offer collection services and then return collected volumes to municipal collection sites.

Origin of collected batteries % estimate	***Average***	***Maximum***
Retail	31	60
Municipal collection centres	36	91
Schools	12	60
Companies	19	65

Table 6: Origin of collected batteries % estimate

Drivers of consumer awareness creation measures

Legislation, particularly in countries with competing organisations, needs to provide clear obligations to motivate organisations to increase consumer awareness. A single national campaign can be more effective in raising consumer awareness than several smaller ones. Without specific regulatory requirements, only the single-organisation model and the competing organisation model with clearing house ensure consistent nationwide campaigns.

Legal obligations affecting consumer awareness

The key approaches providing this motivation are ranked here in order of their effectiveness in increasing the collection rate, as suggested by the trend lines in the graph on the next page:

- **Mandatory consumer awareness contribution to clearing house:** In Italy and Austria, battery organisations must join a coordination centre which also collects set fees and organises nationwide consumer awareness measures. A similar mechanism is being developed in France through a national coordination commission.

- **Measurable awareness creation obligation in a competitive organisation model:** Quantifiable consumer awareness obligations, such as minimum spending (e.g. 3-5% of fee revenue) or frequency of awareness campaigns help to ensure that public awareness is raised by organisations and to limit distortions to competition. By contrast, in a single organisation model the regulator may put a ceiling on consumer awareness spending to limit the scheme's costs to the public.

Measurable legal requirements on systems' awareness creation

Bulgaria	at least 3% of revenues on awareness measures
Denmark	obligation of each producers (depend on POTM ; waived if national campaign
Estonia	nationwide media campaigns, at least once a year
Hungary	two mass media campaigns per year
Latvia	4 measures per year
Lithuania	at least 5% of revenues on information campaigns
Portugal	at least 5% of revenues on information campaigns
Switzerland	at most 25% of revenue on information campaigns (before 2009 15%)

- **No measurable awareness creation obligation in a competitive organisation model:** In a competing organisations model, organisations compete primarily on fees charged to producers which are determined by the organisation's costs. The absence of measureable obligations with regards to consumer awareness measures increases the probability of organisations opting to meet their collection by focusing on the collection of heavy waste batteries from commercial applications. These may not represent the batteries the producer members of the organisation have placed on the market and which may not have been placed on the market as portable batteries in the first place (see chapter 'Distortions in portable battery POM volumes').

Coordination and consistency of awareness creation measures

Taking into account the collection rate achieved and the number of years that separate collection of waste batteries has been in place, the trend lines of the two graphs on the right below support the notion that a single national campaign can be more effective in raising consumer awareness than several smaller ones.

The mono-organisation model's outperformance of all other organisations is probably due to a single, consistent design language on collection points. Collection boxes/containers themselves are an important element of awareness creation measures.

A consistent collection container design increases the frequency of a consumer's contact with the design and thus his/her recall rate of the waste battery collection programme. Some organisations, for example in France, therefore account for the costs of retail collection boxes under the communications budget line.

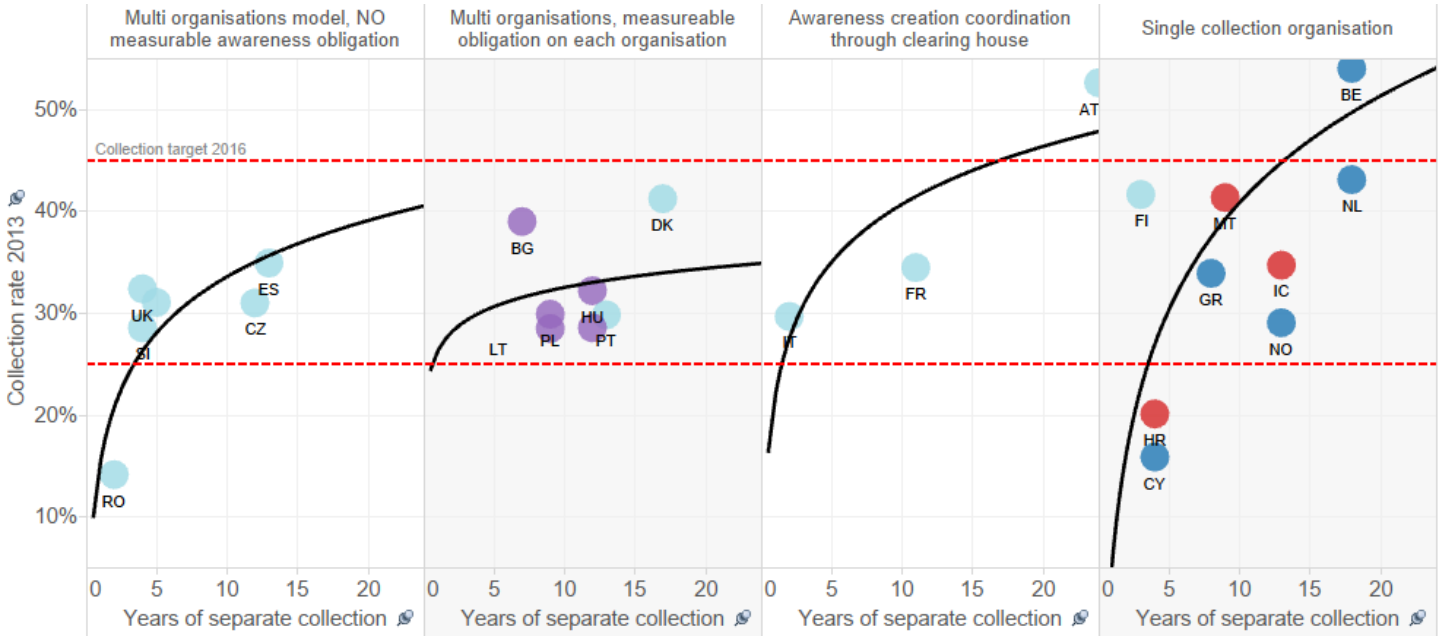


Figure 14: Collection rate in view of factors impacting awareness creation and years of separate collection

Drivers of collection point availability

Turning end-user awareness into disposal behaviour requires the availability of sufficient[50] return facilities for waste batteries. Detailed and measurable obligations on organisations, retailers and municipalities can help to speed up the roll out of sufficient return facilities and raise the long term collection rate. At the end of 2012, the average collection point density in the 26 countries[51] from which data are known or can be based on substantiated estimates was one collection point per 690 residents (or 1.7 collection points per 1,000 residents), ranging from one point for 180 residents in Greece to one collection point for around 1,600 residents in Spain. As with costs for awareness creation, competing organisations need to minimise their costs of collection. Detailed legal obligations are critical in providing clear obligations that motivate organisations to invest in the collection network without the risk of reducing their competitiveness in acquiring or retaining producers. Data suggest a clear positive correlation between a collection obligation for municipalities and high collection rates.

Number of collection points

The optimal number of collection points depends on local conditions, such as population density and the type of collection network. For most countries, an optimal density of collection points appears to be reached when there is one point for every 300 - 500 residents. However, collection point numbers released by organisations are not fully comparable as criteria for counting them vary: For example, Belgian organisation Bebat only counts a registered collection point if it is 'active', i.e. defined as triggering at least one take-back request of a full box per year[52]. Other organisations could not apply this counting criterion as their logistics model services all collection points at regular intervals rather than relying on requests from the collection point host.

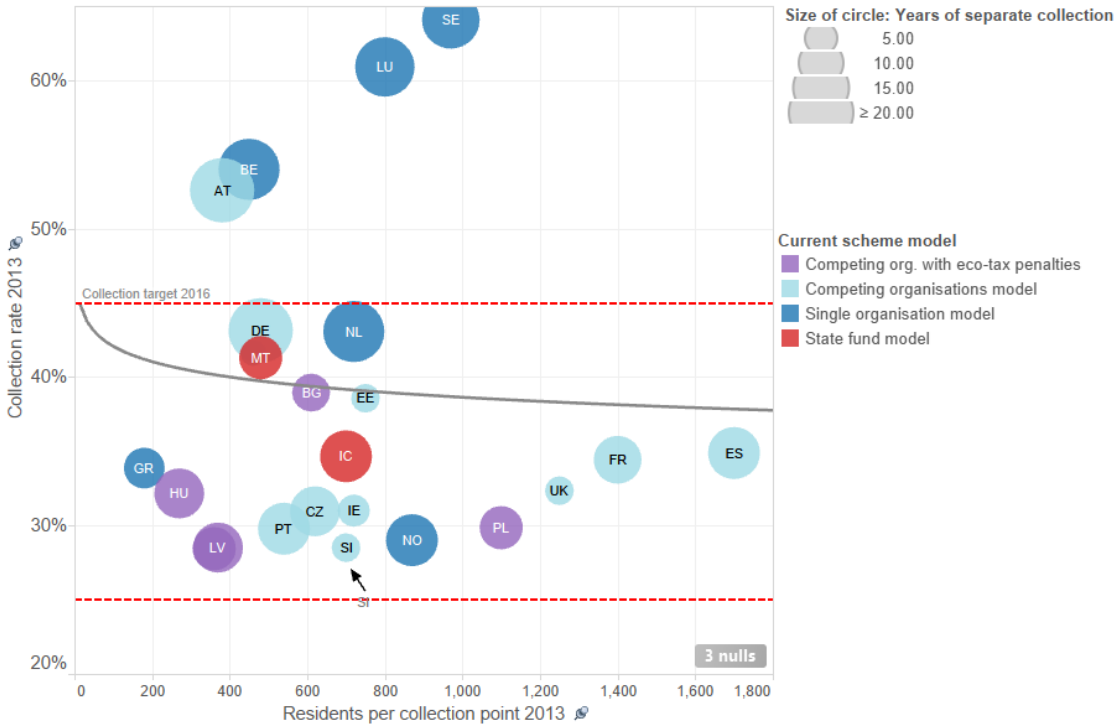


Figure 15: Residents per collection point and collection rate

50 Batteries Directive Art. 8.1(a) requires such schemes to '… enable end-users to discard waste portable batteries … at an accessible collection point in their vicinity, having regard to population density'

51 Data not available for RO, SK; IT and DK data not taken as only number of municipal collection points is known.

52 About 70% of Bebat's registered collection points are 'active'.

Legal obligations on organisations

As with costs for awareness creation, competing organisations need to minimise their costs of collection. Legislation is therefore critical in providing clear obligations that motivate organisations to invest in the collection network without the risk of reducing their competitiveness in acquiring or retaining producers. A few key approaches can be identified, ranked here by their effectiveness in increasing the collection rate as suggested by the trend lines in the graph below:

- A **central coordination of collection**, such as that provided by a mono-organisation or a clearing house, optimises the activities of individual organisations, ensure homogeneous geographical coverage and uniform operating conditions**,** thus increasing a scheme's effectiveness in building and maintaining collection infrastructure.

- **Coverage requirements for each organisation:** Organisation approval requirements stipulating nationwide coverage or a minimum number of collection points. (Another approach was proposed in an April 2013 draft amendment of the Bulgarian Batteries Ordinance: Each organisation must set up a number of collection points pro-rata to its market share).

- **An annual collection target[53] for each organisation**, especially if annually enforced by fines for underachievement or similar instruments[54], provides a strong incentive for collecting up to, but not over, the target. Moreover, if not combined with other requirements, it does not prevent cherry picking and may leave less densely populated areas uncovered.

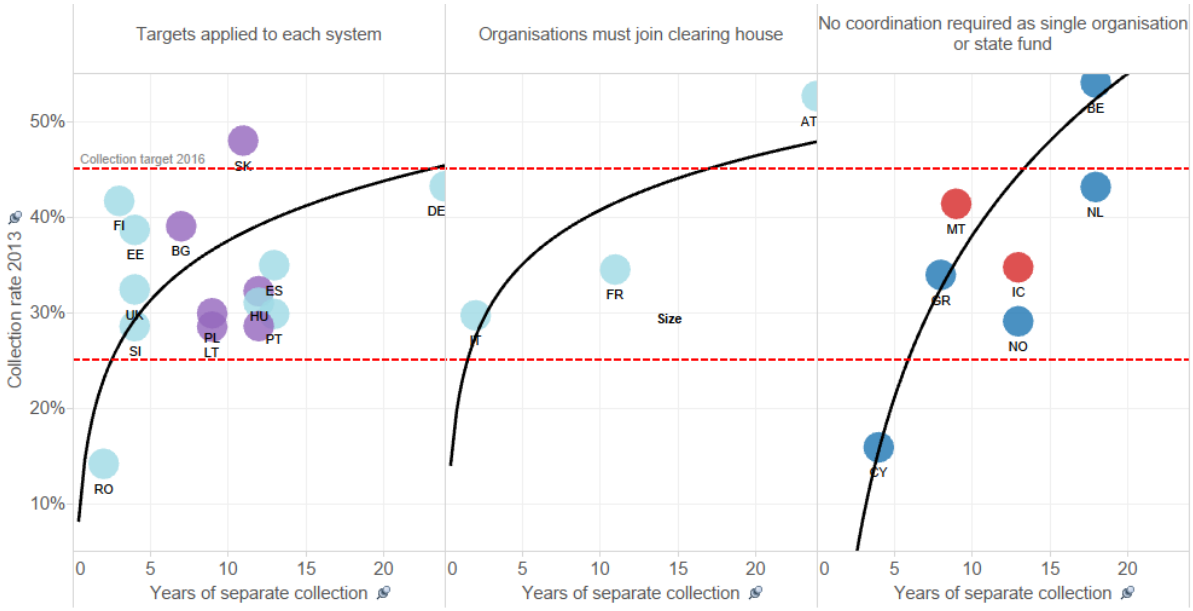


Figure 16: Collection rate in view of factors affecting coordination of collection activities

[53] Note: Intermediate or higher collection target

Belgium	45% in 2010; 50% in 2012
Denmark	1991-96: 75% for the NiCd batteries in 90ties
France	33% in 2010, increasing by 2% annually
Germany	30% in 2011, 40% in 2014
Hungary	18% in 2008 to 45% in 2016
Latvia	25% in 2011, or NRT
Lithuania	25% in 2012, or NRT (80%! before 2012)
Norway	30% of past year POTM for separately sold batteries
Poland	22% in 2011 to 45% in 2016
Portugal	25% in 2010 to 45% in 2015.
Spain	25% by end 2011, 45% by end 2015
Sweden	65% in 2012, 75% in 2016

[54] Collection targets enforced annually by fines or similar in Bulgaria, Hungary, Latvia, Lithuania, Poland, Slovakia only

In the competing scheme model especially, an organisation's collection network is often driven by its owner- or membership structure: retailers whose outlets are used as collection point hosts; EEE producers controlling a WEEE organisation who have access to batteries from WEEE dismantlers; or waste management or logistics companies serving municipalities or industries.

Legal obligations on retailers

Batteries Directive 2006/66/EC requires distributors or retailers to take back waste batteries, but allows member states to waive this requirement '*if an assessment shows that alternative existing schemes are at least as effective in attaining the environmental aims'* of the Directive. The high collection rates achieved by Denmark and Sweden – where retailers have no take-back obligation – and Greece – where retailers have no take-back obligations unless assigned by an organisation – show that 'alternative existing schemes' can achieve comparable levels of collection.

In the remaining 27 countries covered by this report national legislation obligates retailers of batteries to take back waste batteries. Four of these countries exempt small retailers from the obligation.[55]

The effectiveness of the retail return points varies widely between member states due to a number of additional legal requirements, most notably on whether or not

- organisations are required to provide retailers with collection containers, thus ensuring waste battery campaign recognition;
- organisations are required to pick up full containers within a reasonable time period, or alternatively whether municipal collection points are required to accept waste batteries from retailers; and whether
- retailers are subject to a measurable obligation to display the availability of the collection point.

[55] Small retailers are exempt from take-back in Czech Republic, Estonia, Poland and UK

Legal obligations of municipalities

While the Batteries Directive is silent about the responsibilities of municipalities, national legislation in 11 member states holds municipalities partly or fully (DK) responsible for waste portable battery collection. (Municipalities usually oppose an outright legal obligation for collection, as it is usually interpreted as forfeiting compensation for collected batteries.)

Where municipalities have no legal obligation, they still often collect waste batteries. In AT and IT they do so supported by framework agreements between all organisations and a coordination centre that ensures *inter alia* nationwide uniform compensation for waste battery collection.

Taking into account collection rates achieved and the length of time that separate collection has been in place, the data suggest that a collection obligation on municipalities contributes positively to the overall collection rate.

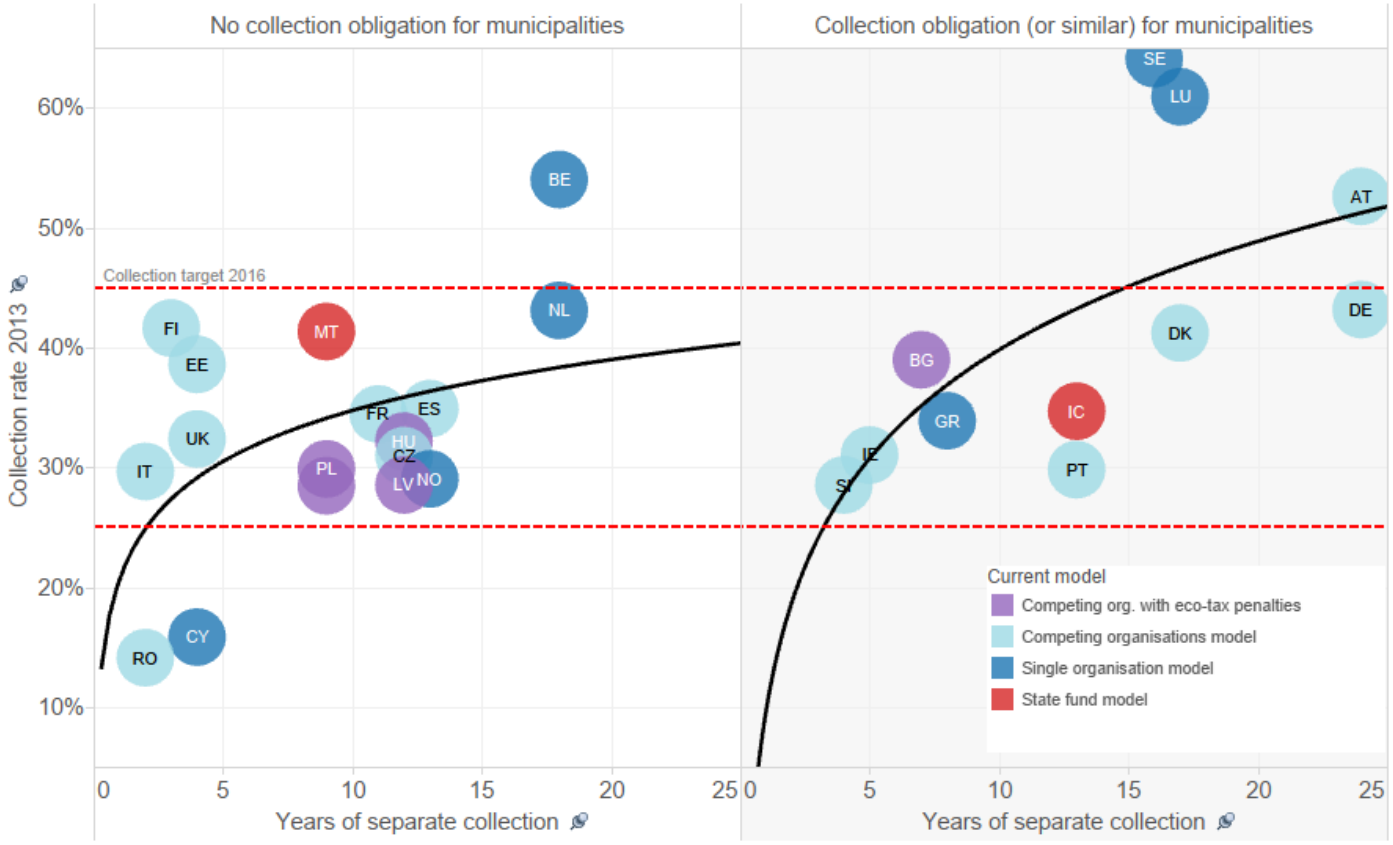


Figure 17: Collection rate in view of participation of municipalities in collection

Conclusions

Conclusions on battery definitions and distorting flows

The Directive has achieved its overarching objective that collection networks for all portable batteries are available - or are in the process of becoming available - in all member states and has triggered model transitions that has harmonised the scope of national battery collection schemes and reduced distortions to competition in a number of countries. The biggest remaining challenge is to ensure that national collection rates reflect the actual performance of the waste portable battery collection schemes. To avoid distortion of competition within the Community these challenges would be ideally addressed at EU level, notably by a) clarifying the distinction between portable and industrial batteries and b) establishing a framework identifying waste batteries available for collection. Point b) would reduce distortions of national collection rates resulting from battery flows that are currently not accounted for such as volumes of batteries that leave or enter a country in used or refurbished EEE or WEEE, that are treated with unreported WEEE, as well as the effects of delayed waste generation due to battery market trends.

Taking into account the limited feasibility of strict enforcement due to the low value and exposure of the waste batteries market compared to other waste streams[56], a review of the Batteries Directive – scheduled after June 2016[57] – may further explore the options discussed on the following pages.

Conclusions about national scheme performance

Clarification of the battery definitions at EU level could largely remove the causes of malfunctioning and distorted markets. The challenges of un-accelerated markets require fine-tuning of obligations for actors involved in the national collection schemes. As in line with the principle of subsidiarity only *'basic principles for financing … should be set at Community level'*[58], the improvement of such obligations should be addressed at national level.

In countries where the scheme's progress in rolling out or expanding existing collection networks has slowed before optimal coverage was reached, three market conditions can be identified. All three can apply in one country to varying degrees:

Condition	***Malfunctioning market***	***Distorted market***	***Functioning but unaccelerated***
Indicator	Supply of non-portable batteries, Organisations without obligation to build collection network	Lack of transparency and consequent distrust	Collection points, share of batteries from end-users does not increase
Cause	Unclear battery definition	Organisations with no obligation to contribute to collection network; Organisations with equal obligation but unequal access to collection point hosts	No measurable requirements on communication measures, collection point density; Low probability of sanctions for not meeting collection targets

Figure 18: Conditions in markets where collection slowed before reaching full coverage

[56] A rough estimate suggests that the costs of battery organisations are around EUR 0.2 to 0.4 per residents and year. This represents 5% of the amount spent on WEEE and 1% of that spent on waste packaging. Financial aspects were not in the scope of this report.

[57] Article 23 requires the Commission to review after June 2016 i.a. the appropriateness of the minimum collection targets

[58] Batteries Directive Recitals 19 and 26

Options for improvement

A. Improve distinctions between portable and industrial batteries

Option A1: Excluding lead batteries from the calculation methodology of the collection rate

Lead batteries contribute 95% to industrial batteries placed on the market but only 0% - 3% of portable batteries POM in most countries (DK, GR, FR, DE, PL – up to 15% in CZ, UK[59]). As lead batteries are the main cause of uncertainty about the present collection rates in many countries and have a positive material value at the end-of-life stage, the exclusion of lead batteries entirely from the calculation methodology of the portable battery collection rate would improve data reliability significantly.

Option A2: Clarifying the term 'portable battery'

To provide or harmonise national interpretations of the portable battery definitions to enable producers and collectors to distinguish between portable and industrial batteries, existing distinctions could be **extended by a weight criterion** (to define the term **'can be handheld')** as is done in some countries[60]. Furthermore, the term 'electric vehicle' in the industrial battery definition should be clarified[61] for example as regards electric bicycles, wheelchairs, hybrid vehicles, leisure craft.

While the addition of a weight based criterion would improve data reliability, opponents of this option argue that it complicates collection: heavy batteries increasingly find their ways into consumer applications (e.g. in gardening equipment, lawn mowers, e-bikes, energy storage solutions, etc.) and are typically returned via retailers or municipal collection points which also collect small portable batteries.

Application-based criteria to identify portable batteries (used in private households vs. used in industry) would not solve this problem as the party reporting POM may not know the application in which the battery will be used.

Option A3: Requiring recycling efficiencies of portable batteries to be reported

Recycling efficiencies[62] are presently required to be reported jointly for all batteries. A legal requirement to report them by battery distinction (portable, industrial) would allow the collection target to be verified by assessing the plausibility of the return rates achieved by the three chemistries and would thus discourage portable battery schemes from collecting non-portable batteries.

Option A4: Introducing a collection target for other batteries to limit their availability for collection

Assigning a collection target to industrial batteries could help deprive the portable battery market of waste industrial batteries[63]. The downside would be significant red tape and disproportionate enforcement costs. The long life cycles of the

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59 Where present guidance presumes batteries of a weight up to 4 kg as capable of being hand-carried and only batteries above 10kg as NOT portable by hand.

60 Stibat (NL): portable battery < 1 kg; AFIS (GR) < 1.5 kg; Ecobatterien (LU) < 2 kg, **from 2015 <3 kg; UK guidance: < 10 kg, from 2016 < 4 kg.**

61 Discussions in the UK on the cost impact for producers of introducing a weight threshold for portable batteries are ongoing. The Government (DEFRA) is expected to address concerns over ambiguities in the definition of the 'hand carryability' of portable batteries, industrial batteries (and in this context the term 'vehicle' which these batteries power) in autumn 2013.

62 Minimum recycling efficiencies for 3 battery chemistries (lead-acid, nickel-cadmium, all other batteries) are presently required to be reported jointly for all batteries without a breakdown into the 'distinctions' (portable, industrial, automotive starter)

63 A combined collection target for all batteries, or for industrial and portable batteries, would not ensure the collection of portable batteries, on a weight basis industrial batteries account for twice the volume, and because of this the collection of portable batteries

batteries would also raise IPR and thereby financial guarantee issues that would add complexity and potential for market distortions. A study into the types of industrial batteries particularly prone to being collected as waste portable batteries might identify specific industrial battery applications that may be suitable for a producer responsibility scheme.

B. Accurately reflecting the volume of waste batteries available for collection

Option B1: Replacing POM with waste batteries 'available for collection'[64]:

MSW analyses by Belgian organisation Bebat and Dutch organisation Stibat suggest that less than 60% of batteries placed on the market actually become available for collection in the same country, due *inter alia* to used EEE exports. Therefore, it is proposed to determine the collection rate as a percentage of 'waste batteries available for collection' rather than batteries 'placed on the market'. As the amount of batteries 'available for collection' will vary between countries, a target based on 'waste batteries available' would allow a more realistic assessment of the performance of national collection operations.

Alternatively, member states could be given the choice of basing the calculation rate on either POM or 'available for collection' for collection volumes, whichever is higher, as provided for by WEEE Directive 2012/19/EU (Recast)[65]. Moreover, to take into account replacement purchases (and thus the probability of expired batteries actually being disposed of, i.e. becoming 'available for collection'), collection volumes used for the calculation could be adjusted by a factor reflecting the economic cycle.

Option B2: Variations of POM base years and current year collection volumes:

By the time the 45% target has to be reached in 2016, all countries will have fairly accurate and consistent POM data available for the past 5-6 years. To account for the trend towards rechargeable batteries with longer lifetimes, the POM base for later years could use 6 year POM averages to more accurately reflect the expiry of batteries.

C. Avoiding distortions from batteries in (W)EEE and reducing administrative burdens

Option C1: Excluding batteries in EEE from registration and reporting obligations

The necessity of including batteries in EEE under the collection target for portable batteries is not evident, as these batteries are typically disposed of in the WEEE and do not find their way into the collection points for separate batteries. The weight effect of replacement batteries on the two collection networks is neutral: If a battery in EEE is replaced and disposed of in the battery collection network before the EEE expires, the separately purchased replacement battery will be disposed of with the WEEE and add to the WEEE collection.

The exclusion of integrated batteries would remove one of the distorting waste flows - exported or imported used EEE.

Moreover, the exclusion of integrated batteries from registration and reporting obligations under the Batteries Directive would reduce the administrative burden of end-of-life compliance substantially (in particular also for SME EEE producers),

is far more expensive. A collection target based on units could overcome this drawback for small batteries but is hardly feasible for collection reporting.

64 Terms also used are waste batteries generation or arising, and referring to these waste batteries that are subject to a disposal action by an end-user

65 From 2016: 45% of POM in preceding three years, from 2019: 65% of 3 year POM or 85% of WEEE generated (equivalent to arising, available for collection). By 2015, the Commission must have established a common methodology for calculating WEEE generation in each Member State

would avoid double charging, would enable 'giving effect' to (implementing) the principle of producer responsibility for EEE, and would prevent two collection targets being applied to parts of one product[66].

Producer responsibility and small EEE producers: We estimate[67] that two thirds of the more than 80,000 companies included in WEEE registers across Europe are responsible for around 1% of EEE POM. The administrative burden of WEEE compliance is disproportionate for SMEs. Doubling these for incremental gains of the battery schemes is questionable at best. Moreover, many of these small companies deal with B2B equipment, for which many of the national transpositions allow individual compliance to reduce administrative burdens. That means these producers comply individually for WEEE but must join a battery scheme for battery compliance.

Double charging: With few exceptions[68], batteries in EEE are subject to the same fees as separately sold batteries. This means producers of EEE with integrated batteries are double charged for collection (not recycling) which the Batteries Directive aims to avoid[69]: the integrated battery is disposed of at a WEEE collection point, financed by the WEEE fee. By paying the same battery fee the producer also shares the costs of the battery collection network.

Consistency of targets: Subjecting batteries in EEE to the targets of the Batteries Directive means that two components of one product (battery and EEE) are subject to two different collection targets, one on the EEE, the other on the integrated battery.

	WEEE	***Waste portable batteries***
2012 to 2015	4kg per capita target (B2C WEEE only) or - from 2014 - the average amount collected in the *preceding 3 years* - whichever is higher	25% of the average weight placed on the market in *current and 2 preceding* years
From 2016	45% of average POM in the *preceding* three years	45% of the average weight placed on the market in *current and 2 preceding years*
From 2019	65% of average POM in the *preceding 3 years* or 85% of WEEE generated	

Table 7: WEEE and waste portable batteries collection targets

Option C2: Exempting small producers

67% of the 1,507 registered portable battery producers in the UK[70] contribute less than 1% of POM. The administrative burden on SMEs as well as organisations would be significantly reduced, but the impact on the schemes' functioning and the environment would have to be investigated.

66 WEEE Directive 2002/96/EC itself avoided target overlaps by not applying to EEE that are part of a product which itself is not in the scope of the WEEE Directive such as vehicles (Directive 2002/96/EC Article 2.1: This Directive shall apply to EEE … provided that the equipment concerned is not part of another type of equipment that does not fall within the scope of this Directive.).

67 On the basis of Ecotrel (LU) finding in 2007 that 64% of its members contributed less than 2% of revenue

68 Slovenia's Batteries Decree stipulates that producers of batteries integrated into EEE do not finance the separate collection of batteries. Swedish battery and WEEE system El Kretsen does not charge extra for built in batteries.

69 Art. 16 requires Member States to not only ensure that producers finance any net costs arising from collection, treatment and recycling but also ensure avoidance of any double charging of producers.

70 The UK is the only country which exempts small portable battery producers from the obligation to join and finance a system (but they still need to register).

D. Aligning the collection rate with national circumstances

Option D1: Applying derogated targets for certain member states to align with WEEE Directive

WEEE Directive 2012/19/EU sets lower interim and delayed final collection targets for 10 member states[71]. It appears likely that most of these, as well as others including Cyprus, Estonia, Portugal, Spain and the UK), will find it difficult to reach the 45% batteries target in 2016.

Option D2: Obligating treatment facilities to report volumes not traceable to an organisation

The problem of expired batteries with a high material value being treated without being reported could be addressed by requiring all parties to report waste battery volumes delivered to treatment facilities or exported for treatment, as proposed by the WEEE Recast Directive[72]. The correct reporting of these streams would be facilitated by adding a battery distinction detail to the existing European Waste Catalogue's battery codes to be recorded at the stage of waste battery consolidation.

Option D3: Encouraging removal of batteries from MSW

Encouraging the sorting of MSW with a view to increasing the collection rate of recyclables, including batteries, could be an alternative to raising consumer awareness, especially in countries where awareness is very low or so high that additional investments in consumer awareness would not raise the collection rate. Also in regions where collection requires disproportionate logistics (as mentioned in the overarching objective of the Directive[73]), or again, where the expansion of the collection network has reached its limit.

71 Bulgaria, the Czech Republic, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovakia and Slovenia must achieve at least 40% from 2016 (rather than 45%) and the final rate (65%/85%) only by 2021 (rather than 2019).

72 Recast WEEE Directive 2012/19/EU obligates member states 'to collect or estimate' quantities of WEEE collected through all routes (but falls short of mentioning the parties that should supply the data.)

73 Art. 7: Member States shall, having regard to the environmental impact of transport, take necessary measures to maximise the separate collection of waste batteries and accumulators and to minimise the disposal of batteries and accumulators as mixed municipal waste in order to achieve a high level of recycling for all waste batteries and accumulators.

COUNTRY ANALYSES

AUSTRIA

Key points

- The Austrian battery collection scheme has been built up since the early nineties. In 2008 it moved from a single organisation model to competing organisations. Municipalities continue to play a key role in collection. The clearing house organises awareness creation measures effectively. POM and collection reporting requirements are less detailed than elsewhere.

- Since the mid-nineties, collection rates of 40-50% have been achieved. Since 2011, rates have increased from 50% to **54% in 2014**. **Since 2010 collection volumes have increased steadily by an average of over 6% per year, POM by around 3% annually.**

Regulatory parameters

Overview

In 1989 Austrian industry set up UFB, a voluntary battery collection organisation, in anticipation of national battery legislation which soon followed with **Batteries Ordinance 514/1990** that included a take-back obligation. The Ordinance did not require producer registration and did not set any collection targets. In 2008, an amendment of the **Waste Management Law** strengthened the producer responsibility provisions on batteries and a new **Batteries Ordinance** closely aligned the producer responsibility obligations for batteries with those on WEEE which were already in place.

Roles and responsibilities in waste portable battery collection

- **Local authorities** must take back waste portable batteries free of charge. From December 2008 producers must take back waste batteries on request if more than 300 kg collected.

- **Producers** must join a compliance organisation. The obligation in the current year is proportionate to the average amount put on the market in the past 3 years.

- Approved **collective organisations** must take back waste portable batteries from municipal collection points they have contracted or – if a municipality does not have an agreement with a organisation – on request from the clearing house. They may operate their own collection points.

- **Retailers** must take back WPBAs free of charge and return them to a organisation's collection point.

- EAK, the **clearing house** for WEEE, has also been assigned this role for batteries. It must collect funds from organisations to compensate municipalities for the costs of collection infrastructure and communication.

Requirements on compliance organisations

Organisations do not have to be controlled by producers or have a non-profit objective but they must allow producers certain co-determination on pricing. Organisations must

- prove a market share of at least 5% in a collection group, or at least 8% in all categories [WEEE organisations: 20%]. This proof was to be delivered for the first time by 10 April 2010 for the year 2009
- take back all waste portable batteries in one or several collection categories
- operate at least one take-back centre per district
- apply the same principles to all producers

- be financed in such a way that the expected costs in a year are covered by revenues in that year
- contractually ensure that participating producers have appropriate control as regards the generation of revenues. This includes access to information about the total amount of batteries put on the market by participants [WEEE organisations were not subject to this requirement]
- agree with participants on how to take into account quantities of Waste portable batteries collected voluntarily by the participants.

Organisations must report, annually by 10, April to the Ministry of Environment, a list of participants and quantities either put on the market or imported for own use and, by 10 September, an activity and financial report for the past year.

Development of compliance organisations

From 1989, Umweltforum Batterien (UFB) voluntarily organised the collection of portable batteries by providing retailers with collection boxes and return logistics, with financing from large battery manufacturers. The organisation took back batteries free of charge from 5,600 collection points at retailers and around 1,600 municipal collection points (or 1 per 1,000 inhabitants).

During the drafting of the 2008 Battery Ordinance, five or six compliance organisations for portable batteries were anticipated - the existing voluntary organisation (UFB) plus the five approved WEEE organisations.

However, the 2008 Ordinance made retailers responsible for transporting collected batteries to collection points, thus taking over a key activity of UFB. This made UFB redundant (it ceased operations at the end of September 2008).

During August and September 2008 all WEEE organisations were approved as battery organisations:

- **UFH Elektroaltgeräte Organisation Betreiber GmbH** established by manufacturers and importers of refrigerators in response to the Cooling Equipment Ordinance of 1993 which extended its activities to all WEEE categories in 2005.

- **ERA (Elektro Recycling Austria GmbH),** founded as a not-for-profit organisation by electronic retailers Conrad Electronic and Niedermeyer GmbH. Shares are held by ERA Association (Verein) (49%), ARA AG (51%). ERA was the first organisation to be accredited, on 2 August 2005.

- **ERP (European Recycling Platform)** originating from a cooperation agreement between Braun, Electrolux, HP and Sony in December 2002 to set up the first pan-European take-back and compliance organisation for WEEE.

- **Interseroh Austria (formally EVA GmbH),** a subsidiary of the Interseroh group. It is also licensed as a recovery organisation for commercial packaging.

ERP initially had the largest share of portable batteries placed on the market, but this declined to 21% in 2012 while ERA's and UFH's shares increased to 56% and 15% respectively.

Waste management company Saubermacher AG retains a key role in batteries management. It manages nationwide collection from retailers and also has contracts with 1,600 of Austria's 2,300 or so municipalities.

The Clearing House - Clearing for over- and under-collection

Stipulated by the 2005 amendment to the Waste Act that transposed WEEE Directive 2002/96/EC, the Elektroaltgeräte-Koordinierungsstelle Austria GmbH (**EAK**) was founded as a not-for-profit organisation in May 2005, mainly by EEE retailers'

associations. In July 2005, it was designated as the clearing house for WEEE organisations by the Austrian Environment Agency (UBA). In September 2005, FEEI (the association of EEE producers) obtained a 25% share from existing shareholders. In 2008, EAK was assigned to act as a clearing house for battery organisations. The clearing house

- presents take-back requests to a organisation through an online platform from the approximately 5% of municipalities that do not have direct contracts with organisations. Organisations are free to select which requests they take up.

- collects funds from organisations to compensate municipalities without direct contracts for container costs and possible costs of construction required for collection of waste batteries. This 'infrastructure lump sum' is paid annually and should finance the municipalities' amortisation costs of completed infrastructure measures. There are 2 options:
    - Fully fitted out: EUR 105 per annum; this requires installation of three drum containers of 120 litres and 2 of 220 litres on 3 sq m
    - Partially fitted out: EUR 67 per annum; this requires installation of one drum container of 120 litres on 2 sq m

- collects funds for nationally consistent communication campaigns to the public. In 2009, EUR 150 million was budgeted.

Take-back coordination has been operational since 1 December 2009.

An issue during parliamentary discussion was the control of the clearing house. Municipalities are legally obligated to take back portable batteries and WEEE from consumers. However, the legislation does not provide for their representation on the executive board of the clearing house (EAK) that had to be established by industry (municipalities only participate in EAK's working group on information campaigns). Municipalities' concerns that this ownership structure would not ensure legal and professional independence were rejected by the Government. Many of the waste management companies contracted by the WEEE compliance organisations are owned by municipalities.

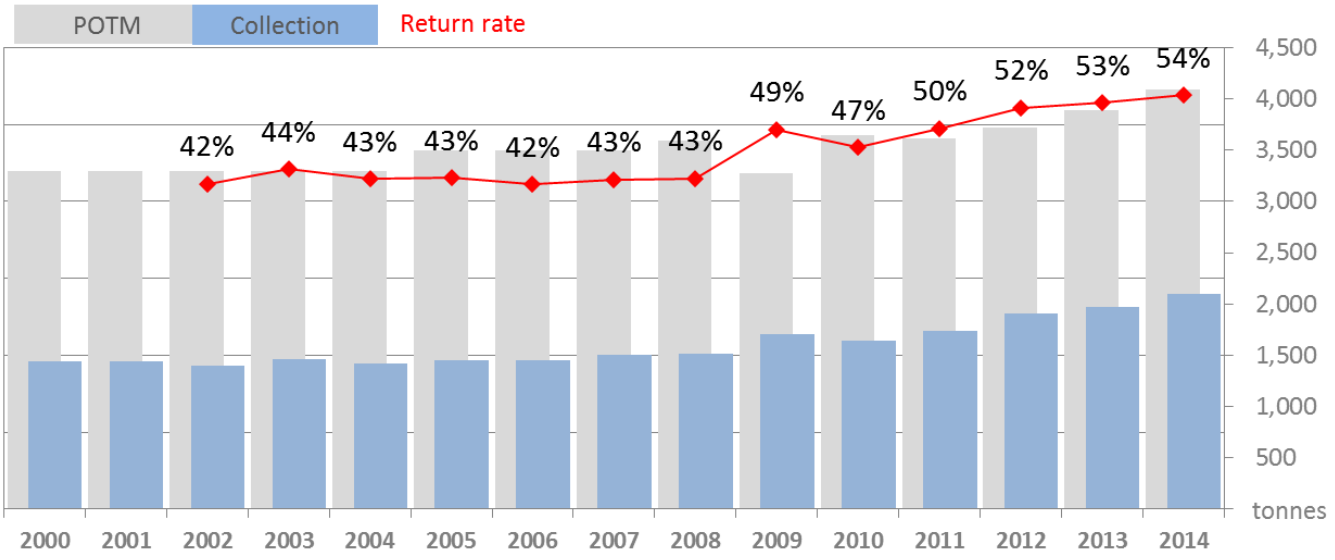
Interface with WEEE organisations

As the WEEE compliance organisations also act as battery organisations, the coordination for collection infrastructure for batteries and small WEEE as well as the administration and contracting of collection partners benefit from economies of scale.

A note on individual compliance of battery producers: The 2008 amendment of the Waste Act rules out individual compliance for portable batteries. For a producer of B2B EEE with integrated portable batteries this means that his battery take-back obligation is based on market share and he must join a collective organisation, while he may comply individually with regard to his WEEE obligations and take back only WEEE arising from his products.

Collection results

Since the mid-nineties, collection rates of 40-50% have been achieved. Between 2011 and **2014**, the rates increased from 50% to **54%. Collection volumes have increased steadily since 2010 by an average of over 6% per year. POM increased steadily (average 3% annually).**



Drivers affecting the collection rates

Availability of collection points and use of collection channels

There are about 23,000 waste portable battery collection points in Austria, or one per 380 residents:

Around 1,500 retailers are supplied with battery collection boxes on behalf of the battery organisations by **Saubermacher AG**. Full boxes are taken back via a parcel service. These contribute about 25% of all collected waste portable batteries.

Around 2,000 municipal collection points contribute about 60% of all waste batteries. They take back not only batteries from end-users but also from around 20,000 retailers that are obligated to take back waste batteries but are not serviced by the organisations. Schools do not play a significant role in collection.

The 2008 batteries legislation and subsequent scheme change left the shares of the different collection channels largely the same (in 2008, municipal collection points contributed 64% of batteries).

Number of collection points and share of collected batteries, estimate:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	1,500	25%
Municipalities	2,000 (supplied by i.a. 20,000 retailers not serviced by organisations)	60%
Schools	20	2%
Companies		8%
WEEE dismantlers		5%

Source: Anonymous

Consumer awareness creation

UFB, which ceased operations in September 2008, had provided waste battery collection bags to each of Austria's two million households and had run a public awareness campaign stressing that the bags should be returned to the retailer. UFB focused also on school collection competitions: In 2003, 356 schools participated, with cash prizes of up to EUR 7,000 available to those which collected most batteries.

Following the changes introduced by the 2008 Batteries Ordinance, EAK collects funds from producers via the waste battery and WEEE organisations for nationally consistent communication: 5% of the collected funds are used for national campaigns, 95% are paid to municipalities which organise public awareness measures and distribute collection boxes.

In 2011, EAK budgeted EUR 85,000 (about EUR 0.01 per inhabitant) for both types of measures. The measures are organised in conjunction with WEEE measures for which EAK budgeted EUR 0.44 million in 2011 (about EUR 0.05 per inhabitant).

The national awareness creation materials consist of a **DVD and information materials for schools,** prepared and revised annually with the Ministry of education and distributed to schools and environmental advisors mainly by the waste management associations of the regions, as well as an **electronic information package** that provides publications of the regions or municipalities and media aimed at mayors and municipal staff with information and text modules for publication.

From top left to bottom right:

- *Advertisement by Tirol region (municipalities distribute these collection boxes to be used in households or shops and at municipal collection sites and offices);*
- *Collection box of Vienna municipality, re-useable collection box of Bruck/Leitha district;*
- ***'School Suitcase' which educators can order for free from industry controlled WEEE and waste battery clearing house EAK***

Consumer awareness and disposal behaviour

A 2010 survey by Linzer Market Institut commissioned by EAK showed that 76% of Austrians were aware of the waste battery collection boxes at retailers and 58% used these regularly to dispose of waste batteries. Older citizens were more likely to dispose of waste batteries correctly: 70% of over 60 year-olds claimed to do so, compared to only 47% of 18 - 29 year-olds.

Accuracy of reporting

Neither POM nor collection reports need to be broken down by chemistry. This prevents a closer analysis of the battery data.

Only 5% of all collected waste batteries derived from WEEE in 2011. Assuming that 35% of all portable batteries are placed on the market in EEE, the return rate for integrated batteries is only 7%, while that of separately sold batteries is 70%. The low collection rate for integrated batteries can be explained by a number of factors:

- Integrated batteries with positive material value disappear at some stage of the collection process without being accounted for
- In addition to large WEEE dismantlers whose volumes of removed waste batteries are accounted for, there are about 10-20 smaller social enterprises that dismantle WEEE and usually deliver removed waste batteries to municipal collection points
- Consumers stockpile WEEE (with the batteries still inside) at home.

BELGIUM

Key points

- Backed up by an eco-tax from 1996 until the end of 2012, single organisation BEBAT has been in operation since 1996 and has achieved a high consumer participation (87%). Municipalities and schools play a key role in collection.

- Collection rates of 40% to 60% **(in 2014 55%)** achieved since the mid-nineties. BEBAT argues that it collects 87% of batteries 'available for collection' and that to increase the collection rate significantly, disproportionate investments in marketing and logistics would be necessary.

Regulatory parameters

Overview

At a national level, several products, including batteries, were subject to an **Eco-Tax Law from 1993**[74] **to the end of 2012**[75], but there was an exemption for any battery compliance organisation that achieved certain collection targets that were calculated as the ratio of collected batteries to 'replacement' (separately sold) batteries[76] put on the market in the same year. The targets rose from 40% in 1996 to 75% in 2000, before being reduced to 60% for 2002 and rising to 65% in 2004 and beyond. From 2010, regional legislation put the collection target at 45%, and from 2012 at 50%, using the formula for calculating the collection rate in Batteries Directive 2006/66/EC.

Waste and Producer Responsibility legislation falls under the responsibility of the three regions: all three regions – Flemish, Walloon and Brussels Capital – introduced **producer responsibility decrees** between 1999 and 2002 that required producers to take-back certain batteries. By late 2010, all three Regions had amended their decrees to bring them into line with Batteries Directive 2006/66/EC.

The Regional Decrees are complemented by **Environmental Agreements (MBOs)** between each of the three regional governments and sector associations that stipulate operational details for the collective battery management organisation. The agreements – which have a duration of 3-5 years, renewable – confirm BEBAT as the organisation for portable batteries and – from 2011 – for industrial batteries. **As the current MBO governing Bebat will expire at the end of 2015, a revised MBO governing Bebat is negotiated with the Flemish Government (November 2015). MinaRAAD, the strategic advisory council on environmental matters to the Flemish Government, noted in March 2015 that a joint MBO of the regions would be desirable but, failing this, Flanders should proceed on its own. MinaRAAD further noted i.a. that**

- **a revised basis for the collection rate ('available for collection rather than POM) seems appropriate in due course;**
- **current thermal processing of waste batteries in Belgium may consider the recovery of metals from (fly) ash, and Bebat should co-finance relevant research (i.a. a study on BAT to limit metal losses during recycling) using its financial reserves;**
- **Bebat should be free in selecting processing partners but should follow the BAT study results;**

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74 The Eco-Tax Law of July 1993, amended 2003, establishes an excise tax on certain products and types of packaging deemed to cause environmental nuisance. These include batteries, taxed at a rate of EUR 0.5 per unit. The application of the Law proved impossible in practice and the imposition of the eco-tax was deferred until January 1996. The 1996 version extended the scope to rechargeable batteries and introduced the option of an exemption if the batteries were recovered through a collection and recycling organisation, even if there was no deposit. The recovery organisation had i.a. to be funded via a collection and recycling levy fixed by the state at FB 5 (EUR 0.1239) excl. VAT per battery, and had to reach collection rates of 40% in 1996 and 75% in 2000.

75 The Finance Act of 27 December 2012 abolished the eco tax on batteries with effect from 1 January 2013.

76 Replacement batteries are all batteries not built-in or shipped with an appliance.

Roles and responsibilities in waste portable battery collection

- Up to the beginning of 2013, **producers** would have had to pay an eco-tax of EUR 0.5 per battery placed on the market unless they achieved a collection rate of 45% from 2010 and 50% in 2012 through an agreed collective or individual compliance organisation (which was the case). They must take back batteries collected by distributors, municipalities and other final holders. In January 2013, the national eco tax was abolished. BEBAT's fees ('environmental contribution') remain subject to approval by each of the three regional authorities.

- **Retailers** and distributors must take back batteries free of charge from end-users.

- A **battery compliance organisation** must be approved by the three regional Environment Agencies and must submit an annually updated waste, communications and financial plan. Members of BEBAT must show the fee they pay to BEBAT on invoices to distributors or retailers (but not to private end- users).

- **Municipalities** are not obligated to collect waste portable batteries (hence BEBAT must pay a fee for the use of the municipal facilities if municipalities do collect waste batteries).

Requirements on compliance organisations

Organisations must be open to all producers subject to the take-back obligation and must operate on the basis of an approved waste management plan that must be submitted 6 months after signature of an Environmental Agreement between government and relevant industry sector. The plan must include a financial plan covering the duration of the agreement (5 years) and must be updated annually. The plan must *inter alia* describe

- measures for qualitative and quantitative waste prevention
- collection measures
- measures for the tracking of the waste stream
- awareness-creation measures
- financing of collection and recovery.

Development of compliance organisations

There is only one compliance organisation for batteries: in response to the 1993 eco-tax, producers, importers and distributors of batteries set up a fund (Fonds Pour La Collecte Des Piles a.s.b.l; BEBAT a.s.b.l.) in August 1995 to handle the collection of batteries themselves. **BEBAT** started operations in January 1996. Since 1999, BEBAT has financed operations through a flat, government ordained fee of EUR 0.1239 per battery placed on the market (a quarter of the eco-tax amount). BEBAT requires producers to show the fee visibly on invoices to professionals, e.g. distributors or retailers. For reasons of consistency and simplicity, industry continues to prefer this forward financing model. The removal of the eco-tax from January 2013 enabled BEBAT **to modify its fees** to reflect actual waste management costs from 2014 and to reduce its financial reserves (EUR 118 million by end 2014) which had accrued due to the government ordained fee (EUR 0.1239 per battery) having been significantly higher than actual operating. **To accelerate the reduction of the financial reserves of the WEEE and battery compliance organisations, the Flemish Parliament proposed in July 2015 an annual tax of 3%[77] presumably to be charged on the reserves of Recupel and Bebat from 2015 to 2019. In October 2015, the Flemish Government announced that it in principle approves a decree to tax the *revenue* of the organisations at 3% from 2015 to 2019, which is unlikely to achieve the objective of the original proposal.**

Interface with WEEE organisations

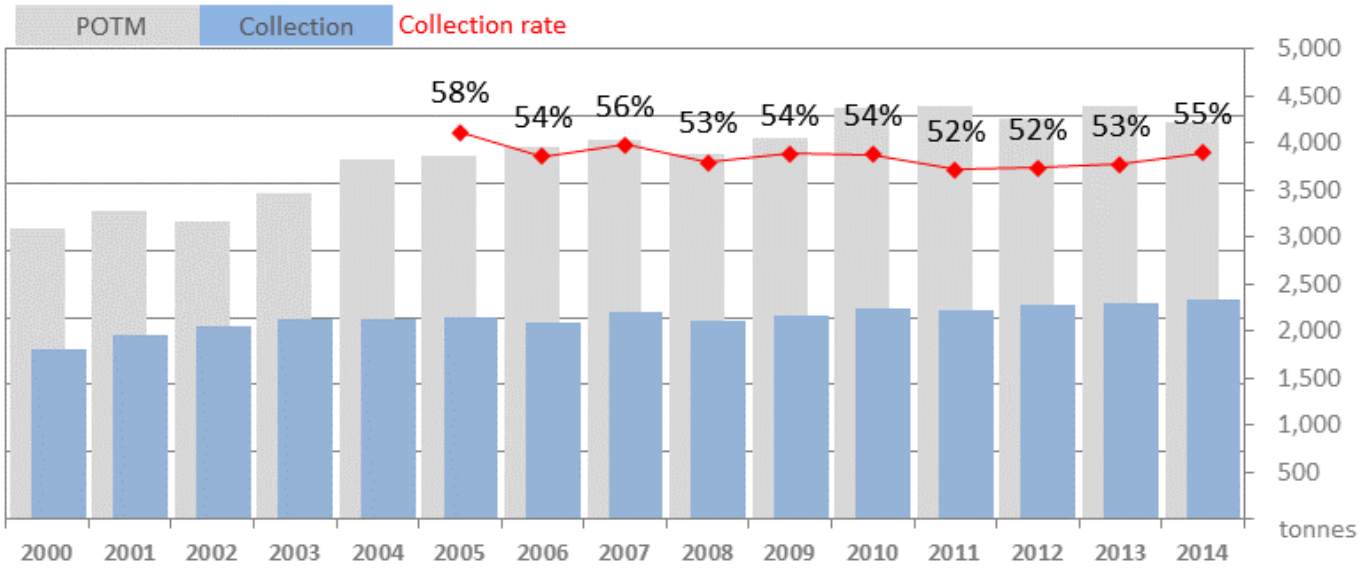
Producers of EEE with integrated batteries must register with and pay BEBAT directly. BEBAT takes back dismantled batteries from WEEE organisation Recupel free of charge.

[77] **The 3% amount was set taking into consideration that about 60% of Belgium's population reside in the Flemish region.**

Collection results

Collection rates (using the methodology of Directive 2006/66/EC) of 40% to 60% have been achieved since the mid-nineties. **Bebat's collection rate edged up from 53% in 2013 to close to 55% in 2014 as collection increased by 5% and POM decreased by -4% over 2013. It collected over 98 million spent portable batteries (23.9 g per collected battery).**

BEBAT estimates that the 2011 waste battery collection volume represents 87% of all waste batteries available for collection[78]. The estimate is based on a 2011 analysis of 5,000 household waste bags (40,000 kg) carried out by RDC/Intertek/Sita on behalf of BEBAT which found only one battery per 100 kg of household waste.



Source: BEBAT; Note: Pre-2010 BEBAT collection data are adjusted by us to account for portable batteries only: Based on confirmed data from 2010-12, the portable batteries share of all collected batteries by BEBAT is assumed to have been 86% in all years.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 24,000 active[79] waste battery collection points in Belgium, or one per 450 residents. The average Belgian resident lives less than 400 m from a battery collection point.

Since 1996 BEBAT has been placing its collection containers in shops. About 600 municipal container parks also host BEBAT collection boxes and have an agreement for reimbursement with BEBAT. Schools play an important role in the collection organisation, contributing almost a quarter of all collected portable batteries.

In addition, two or three times a year BEBAT distributes to each of Belgium's 4.5 million households, small collection boxes for storage and plastic bags for delivery of batteries to a collection point.

[78] This translates into ratio POM / 'available for collection' of 1 : 0.6, with 40% of batteries placed on the market not available for collection

[79] Bebat has 24,500 active collection points, with at least one collection per year. In total there are 35,000 registered points

Since 2011, BEBAT has been approved as a organisation for industrial batteries and many of its collection points cover both portable and industrial batteries.

Number of collection points and share of collected batteries, **2014**:

Collection point host	*Number of collection points**	*Share of total waste battery collection*
Retailers	13,000	17%
Municipalities	600	27%
Schools	7,000	20%
Companies	3,000	31%
WEEE dismantlers	5	5%

Source: BEBAT

Awareness creation measures

BEBAT uses TV, radio and internet media. While during the first 3 years of the organisation the percentage of population claiming to dispose of batteries separately increased quickly (from 46% in 1996 to 81% in 1999), maintaining consumer participation at a high level requires constant engagement.

BEBAT concludes that while TV and radio build organisation awareness, the bags and boxes for collection at home are a great tool for persuading consumers not to thrown waste batteries into the household waste bin but rather store them until a member of the household visits a collection point.

- **Collection boxes:** BEBAT brand identity was updated for 2013. Easily recognisable collection boxes are distributed to collection points. Web applications such as a collection point locator and software to facilitate the process of pick-up requests.

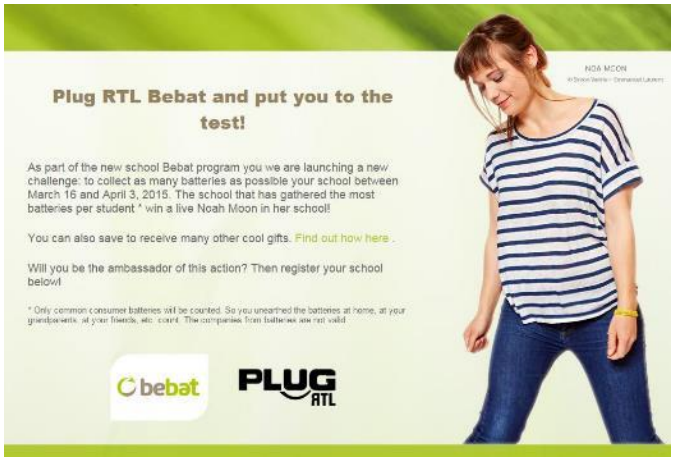


Small collection boxes for storage (left) and plastic bags (right) for delivery of collected batteries to a collection point are distributes to every home in Belgium. **2015 models:**




In 2013 and 2014, Bebat and WEEE organisation Recupel established joint collection points ('PointdeRecyclage') for WEEE and batteries:

- **School campaigns:** BEBAT offers 'points' to schools based on volumes collected. Accumulated points are then exchangeable for various educational or sports equipment. **In March-April 2015, Bebat, in cooperation with Plug RTL, launched a battery collection competition between schools ('La grande récolte inter-école'). The winning school was awarded a live performance by singer Noa Moon (pictured below).**



- **Villa Pila (below right):** BEBAT conducts educational tours for school children from 3rd – 6th grade through a building known as 'Villa Pila'. Located in Tienen in a facility next to BEBATs offices, every year over 4,000 school children and 750 adults learn about the history of batteries, how they are made and recycled. The facility also houses a large sorting machine.

- **Raffles: Bebat, in association with Natagora (a non-profit environmental protection group), organises a monthly raffle where participants can win prizes. Participation requires the drop-off of six batteries (as well as the participant's contact details) at any designated collection point.**

Consumer awareness and disposal behaviour

Surveys commissioned by BEBAT found that

- **95% (2014)** of the population were aware of the need for separate disposal of batteries (up from 91% in 2012 and 84% in 2010).
- 84% (2012) claimed to dispose of batteries separately (2010: 82%) while 16% admitted to throwing spent batteries into the dustbin (this figure was supported by the 2011 analysis of household waste bags, see collection results),
- awareness of BEBAT's brand was **86% (2014)** (up from 74% in 2012 and 56% in 2010).

Moreover, these surveys found that

- the average household in 2012 had a stock of 115 new, in use or used batteries (2010: 107 batteries per household).
- **the average Belgian disposes of batteries two batteries three times a year (2014)**
- **24% of Belgians store used batteries at a specific location in their home, but then forget to drop them off at a collection point (2014). The priority for consumer awareness measures in 2015 is to instil a reflex in consumers to drop off collected batteries regularly.**

Accuracy of reporting

POM

BEBAT members must distinguish POM by primary and secondary batteries, chemistries and whether they are integrated into EEE or sold separately. The declarations of 1/3 of BEBAT members are audited each year. Most mistakes found have been minor. Scope for reporting errors is seen in the distinction between portable and industrial batteries and in accurately accounting for batteries integrated in EEE. Pre-2013 challenges also arose from scope inconsistencies between the Eco-tax Law and the Producer Responsibility Decrees[80].

[80] The Eco-tax Law exempted certain batteries (for example those in hearing aids and medical devices) which the Producer Responsibility Decrees included. BEBAT has covered these batteries since January 2007.

Collection

Collected volumes are distinguished by the same criteria as POM. BEBAT's environmental agreement stipulates ISO17020 certification from collectors, battery sorting and treatment facilities from 2015.

Scope for reporting errors is seen in distinguishing waste portable and industrial batteries and accounting for waste batteries removed from WEEE. BEBAT notes that the collection rate of lithium-ion battery packs for mobile phones, laptops, tools and other electronic appliances remains below 10%, far less than that for primary batteries.

Potential for improving collection rates

BEBAT intends to increase the collection rate of batteries removed from WEEE by carrying out campaigns in co-operation with WEEE organisation Recupel and WEEE-dismantlers. In addition, tighter legal requirements for retailers and other collection point hosts could contribute to increasing the visibility and density of collection points.

BEBAT argues that - given its already very high consumer participation (87%) and dense collection network – a significant increase in the collection rate would require disproportionate investments in marketing and logistics.

Maintaining the current collection rate is made more difficult by the increasing trend towards rechargeable batteries[81] whose much longer active life means they become available for collection at a much later date then primary batteries. Moreover, appliances containing these rechargeable batteries are frequently sold for re-use outside Belgium which ensures that the batteries never become waste in Belgium.

BEBAT therefore argues that in order to accurately reflect the collection rate, the rate should be calculated on the basis of waste batteries available for collection ('waste batteries arising') rather than batteries 'placed on market'.

[81] Bebat data show that – not taking into account lead acid batteries – the share of secondary batteries as a percentage of all batteries POM increased from 25% in 2005 to 36% in 2011.

BULGARIA

Key points

- Although batteries have been subject to mandatory take-back legislation and product fee legislation since 2006, the first battery compliance organisations were only approved in January 2009. Their number grew to 20 by 2011. Measures to reduce this number and ensure the targets are properly achieved came into force in 2013. Due to comprehensive legal requirements and good supervision, the regulatory mechanism appears to function solidly.

- Collection of waste portable batteries has increased rapidly, from 2g per capita in 2009 t**o 40 g in 2014, a collection rate of 45%. The country's national portable battery collection target as a percentage of POM *in the same year* has been exceeded since 2012, though only by 1% in 2014.**

- Potential to raise the collection rate is envisaged through better enforcement of retailers' obligation to visibly display battery bins, and increased consumer awareness campaigns, particularly in rural areas.

Regulatory parameters

Overview

Batteries are subject to mandatory take-back legislation as well as product fee legislation:

- From January 2006, the **Waste Batteries Ordinance** (published 15 July 2005) required producers *inter alia* to collect 3 g per capita of portable batteries in 2008. An amendment to the Ordinance (published 1 January 2009) set annual collection targets as % of POM (increasing from 5% in 2009 to 40% in 2014). Another amendment (published 31 March 2011) established – for the first time – a public register of EEE, battery and packaging producers, to be run by the Executive Environment Agency (EEA), and introduced stricter control and enforcement procedures, including requirements for independent financial audits of reports from compliance organisations. In July 2012, a **new Waste Act** imposed stricter requirements on producer responsibility organisations with the aim of limiting their numbers. A **new Waste Batteries Ordinance,** published in January 2013, no longer allows producers of integrated batteries to comply through WEEE organisations from January 2013. An amendment, published in June 2013, requires the number of collection points of approved organisations to be proportional to their market share. **A draft amendment released in July 2015 notably allows batteries that do not meet the substance limit to continue being sold until stocks are exhausted.**

- As an enforcement instrument to the Producer Responsibility Ordinances, the **Product Fee Decree** (82/2006, replaced by 120/2008) has, since 2006, required producers and importers to pay a product fee to EMEPA, the Enterprise for Management of Environmental Protection Activities (formerly NEPF, National Environmental Protection Fund). In addition to the monthly reporting, importers and producers must submit a quarterly report on volumes placed on the market and the amount of product fee paid. Producers complying through a collective or individual organisation are exempted from paying the product fee but must fulfil the laborious reporting obligations. Should the compliance organisation's targets not be reached, the Ministry of Environment and Water may order them to pay the fee in arrears. Under-achievement of the collection target by up to 30% means that the organisation must pay the fee x 2 on the underachieved amount. Underachievement above 30% is fined with 100% of batteries placed on the market being subject to the Product Fee.

Roles and responsibilities in waste portable battery collection

- **Producers** have to meet annual collection targets (e.g. 25% of POM in 2011, 30% in 2012, **35% in 2013 and 40% in 2014**). They can transfer their waste battery collection obligation to a recovery organisation (organisation). Producers that do not join a compliance organisation or that comply individually must pay the Product Fee. The fee increased from EUR 2,050 per tonne of portable batteries put on the market in 2008 to EUR 3,100 in 2012.

- **Retailers** must take back, free of charge, batteries of the same type as they sell.

- **Compliance organisations** do not have to be controlled by producers. They must be commercially registered, must not distribute profits to shareholders and must operate according to an approved waste plan. Individual organisations are subject to the same requirements.

- **Municipalities** must set up collection points (under the Waste Act); must ensure that all producers/compliance organisations have access; and must organise collection activities and storage in agreement with producers/compliance organisations.

Requirements on compliance organisations

A 'recovery organisation' (either collective or individual) must

- be a commercially registered entity
- not distribute profits to shareholders
- not allow founders to reserve pre-emptive rights for themselves
- treat members on a non-discriminatory basis
- provide a bank guarantee to the EEA: for battery organisations this is LEV 100,000 (EUR 50,000) (Note: Packaging and WEEE organisations have to provide bank guarantees to of LEV 1 million (~EUR 500,000)).

However, there are no requirements regarding the ownership structure of compliance organisations.

A compliance organisation must present a waste management plan for approval by the Regional Inspectorate of Environment and Water, which has one month to reply. Organisations' permits are valid for up to 5 years and can be renewed. The plan must include

- a financial plan including initial investment and operating costs
- a collection plan to achieve targets and including contracts with operators
- marketing/business development measures
- measures to meet collection and recycling targets
- measures taken on storage, pre-treatment, etc.
- measures taken in case of temporary interruption of collection
- planned information campaigns
- measures to reduce heavy metals
- measures taken to cope with negative market prices of recycled materials

Organisations enter into contracts with municipalities to fulfil their collection obligation.

Development of compliance organisations

Market of compliance organisations

Since 2006, battery producers have paid a fee to the Enterprise for Management of Environmental Protection Activities (EMEPA). In 2006 EMEPA collected EUR 1.64 million in product fees from batteries, which represented 11% of its total fee revenue (for comparison, WEEE = 32%). EMEPA invested 87% of the revenues in both years in waste management and waste reduction grants to municipalities. By 2010, product fees collected from batteries by EMEPA dropped to EUR 360,000, as approved WEEE and battery organisations had become available as an attractive alternative to the Product Fee payment[82].

In January 2009, **Eltechresource** the first compliance organisation specifically for batteries, was approved. From August 2009 seven further battery organisations were approved, all linked to waste management companies, and by 2011 there were over 20 collective organisations through which battery producers could comply: 13 WEEE compliance organisations (for producers of EEE with integrated batteries) and 7 battery organisations.

The new Batteries Ordinance entering into force in January 2013 prohibited compliance for integrated batteries through the WEEE organisations. Seven battery organisations were approved under the new Ordinance at the beginning of 2013 for the 5 year period to 2018:

1. **Ecobattery** – which until 2012 operated under the name of largest WEEE organisation **Eltechresource** - is a subsidiary of Makmetal. Eltechresource began operations in late 2009 and by 2012 had achieved a market share of 76% of POM.
2. **Nord Recycling** (Nord Metals) had 90 members in 2012, with a market share of 11%.
3. **Recobat** had 16 members in 2012 and a total market share of 7%.
4. **UBA Recycling,** backed by Rovotel Steel, had a market share of 3% in 2012.

Others are **Nooro**, **Transins Battery** and **Ecobulbattery** (linked to metal recycler Nadin Group).

Market shares and clearing for over- and under-collection

Organisations are granted annual exemptions from the product fee payment by Ministerial Order, retroactively around June for the previous year. These Orders confirm the volumes each organisation has placed on the market and collected in the past year and show the organisation's market share. Based on these data, a collection target (in tonnes) is set for the current year in the same document.

Share %	*2013 POM*	*2013 Coll.*	*2014 POM*	*2014 Coll.*
Ecobattery	**65%**	**65%**	**67%**	**62%**
Nord Recycling	**12%**	**12%**	**12%**	**14%**
Recobat	**9%**	**9%**	**7%**	**8%**
All other compliance organisations	**13%**	**14%**	**13%**	**15%**

Source: Compliance organisations' input/output data

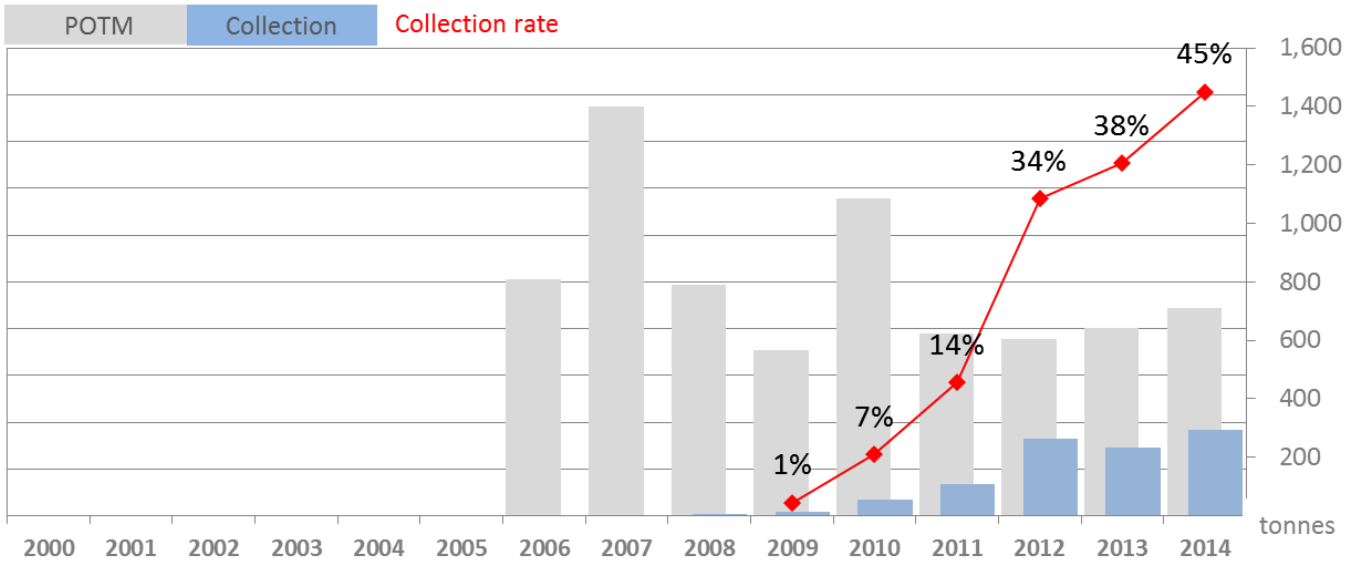
Interface with WEEE organisations

As the major battery organisations are directly or indirectly controlled by the same waste management companies as the WEEE organisations, there are synergies in collection and few barriers to reporting data flows.

82 Organisations charge producers a percentage of the product fee. Published prices are 50% to 60% of the product fee, which translates into about EUR 1,000 per tonne of portable batteries put on the market.

Collection results

The collection of waste portable batteries has increased rapidly, from 2g per capita in 2009 to 36 g per capita in 2012, 33 g in 2013 **and 44 g in 2014**. **The country's national portable battery collection target as a percentage of POM *in the same year* was missed in 2011 but has been exceeded since 2012 – though in 2014 only by 1%.** The share of lead batteries in POM is low (2% in 2013).



Source: 2013/2014 EEA report. Before EEA Register and Ministry of Environment and Water

Drivers affecting the collection rate

Availability of collection points and use of collection channels

Based on data from some of the organisations, we estimate that there are about 12,000 waste portable battery collection points in Bulgaria, or one per 610 residents.

Collection point host	***Number of collection points 2012***	***Share total waste battery collection***
Retailers	12,768	~60%
Municipalities		
Schools (and Kindergartens)	1,275	
Companies (Administrative and other public buildings)	1,837	
WEEE dismantlers		

Source: Ministry of Environment and Water, own estimates based on incomplete organisation data

Consumer awareness creation measures

Legal requirements

The legislation provides for enforceable requirements as regards awareness creation measures: Organisations must spend at least 3% of annual fee revenues on awareness creation measures, including campaigns organised by contracted municipalities. Retailers are required to publicise waste battery take-back on signs.

However, there is no central awareness creation mechanism due to strong competition, which according to the organisations has a negative effect on awareness creation measures.

Ecobattery

Ecobattery has been running year-round, nationwide battery collection information campaigns, targeting all age groups. The campaigns use print media (flyers in mailboxes, brochures for schools, fairy tales for little children), web banners, radio programmes, outdoor posters and in-store flyers and posters. TV advertising is not used for cost reasons. Ecobattery notes that the effectiveness of all media remains quite high as consumer awareness is raised from a low base, but also that battery collection is the 'last concern of a normal household'.

- **Collection boxes:** EcoBattery has distributed different sized durable collection boxes to retailers and other collection points.

- **Posters, books and flyers:** EcoBattery distributes printed material around schools, collection points and residential areas to boost awareness.

UBA Recycling

2014:

Nord Recycling

Nord Recycling launched an educational campaign entitled 'Do not dispose of hazardous waste – it is harmful' in mid-2012 in cooperation with the Ministry of Environment. A superhero named 'Ekoman' was created for the campaign. **Ekomanthemed events** demonstrate proper collection, separation and storage of hazardous waste, including batteries.

Consumer awareness and disposal behaviour

No surveys have been carried out yet. Due to competitive pressure, battery organisations are unlikely to conduct individual surveys unless assigned to do so by the Government.

Accuracy of reporting

POM reporting

Producers must reports batteries POM by chemistry. There is no requirement to distinguish between separately sold and integrated batteries.

POM data have fluctuated very strongly: Prior to 2011, the Executive Environment Agency (EEA) collected data from customs authorities which showed that the amount of portable batteries placed on the market dropped from 190 g per capita in 2007 to 78 g in 2009 before increasing back to 149 g per capita in 2010. However, the 2012/2013 data – now sourced directly from producers – show only about 83g and 93 g per capita respectively, which is lower than in countries with comparable GDP per capita.

The recent low values may be due to free-riders (the Government has taken some enforcement actions against free-riders but a lot still needs to be done) and missing or underreported weights of batteries in EEE. Importers are often not aware of the weight of batteries in EEE. It is likely that it will only be properly accounted for once reports from a large number of EEE importers have been audited.

Collection data

The data from the **EEA register** (used in this report) were not always aligned with the sum of the performance of each organisation – as confirmed by **Ministerial Orders**: while in 2011 the register data show a collection rate of 17% (current year basis), the sum of the confirmed collection volume of all organisations results in a 33% ratio.

Organisations must report collected volumes by chemistry which can be a challenge, especially when exported waste batteries are sent for treatment in facilities without adequate sorting capacity.

Potential for improving collection rates

Potential for improving the collection rate is seen foremost in better enforcement of retailers' obligation to visibly display battery bins and increasing the minimum spending requirement for consumer awareness campaigns, or alternatively requiring (TV) media to provide free advertising space to increase consumer awareness, particularly in rural areas.

CROATIA

Key points

- Since late 2007, portable batteries (including those integrated into EEE) have been subject to fee payments to the Environmental Protection and Energy Efficiency Fund (EPEEF). In 2013, the option for producers to comply collectively or individually was implemented in framework legislation. **In October 2015, a new Waste Batteries Ordinance removed industrial and automotive batteries from the fund financing regime. The new legislation lowers fees for portable batteries but they are expected to remain subject to the fund regime until at least 2017.**

- A collection rate of 29% was achieved in 2012, falling to 20% in 2013 and **19% in 2014, as collection decreased by -5% and POM by -16%.**

- As of 2014, 8 waste management companies are authorised to collect waste portable batteries and 3 of those companies are also authorised for waste battery treatment/export **(all waste portable batteries are exported).**

Regulatory parameters

Overview

Croatia became the 28th EU member state on 1 July 2013.

The December **2006 Waste Batteries and Accumulators Ordinance** subjected batteries produced or imported into Croatia (including those integrated into EEE, but excluding those permanently attached to EEE) to the payment of fees to the EPEEF. The Fund in turn reimburses entities involved in collection and treatment of Waste portable batteries. **Until 2013, the Ordinance was revised four times.**

A new **Waste Management Act** (transposing EU Directive 2008/98/EC), published in July 2013, notably requires municipalities to collect waste batteries and provides producers with the option to comply through collective or individual programmes as an alternative to Fund payments.

In October 2015, a new Waste Batteries Ordinance repealed the 2006 Ordinance and notably removed industrial and automotive batteries from the fund financing regime. The new Ordinance does not provide for collective and individual compliance options for portable batteries as the government feels that the fund regime is working well and plans to maintain it until at least 2017, when the licenses of current collectors and treatment operators expire. Despite maintaining the fund regime, the draft requires portable batteries producers to take-back waste batteries.

In addition, a Decree on Waste Batteries, released in the same month, replaces the fixed EPEEF fees for portable batteries with fees that reflect the actual costs of their waste management. The new fees are scheduled to be set each year by February.

Both legislative texts are part of a wider plan to reduce the financial burden on industry resulting from compliance with waste management legislation.

Roles and responsibilities in waste portable battery collection

- Since October 2007, **producers/importers** have been required to pay fees of about **EUR 1,110 (2014)** per tonne to the EPEEF on 100% of batteries produced or imported into Croatia. The fee is calculated on the basis of data from the customs authorities submitted to the Fund.
- **Retailers** must take back waste portable batteries of a similar type to those sold, free of charge and regardless of origin, including those that were integrated into EEE.
- Approved **waste battery** collectors must take back collection boxes free of charge from retailers within 24 hours of receiving a request.
- **Approved treatment operators** are required to take waste portable batteries from collectors at no charge and must meet the minimum recycling targets.
- **Local authorities** are required to collect waste portable batteries.
- **EPEEF** to oversee the scheme, collect data, operate the financing mechanism and meet collection targets.

Requirements on compliance organisations

Battery compliance organisations require approval from the Ministry. There are no requirements as regards the parties controlling them nor on profit-making. Fees charged by the compliance organisations are to be regulated by decree.

Development of compliance organisations

The current implementing legislation does not allow for individual or collective compliance through compliance organisations. This is not expected to change before 2017.

Market shares and clearing for over- and under-collection

n.a.

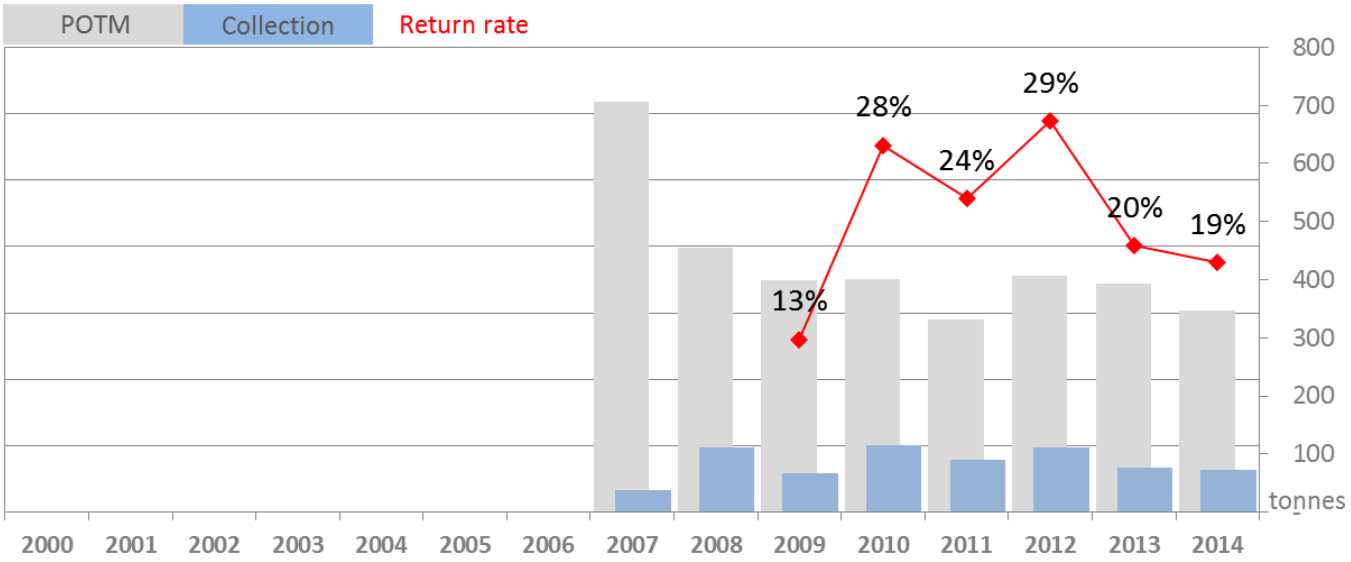
Interface with WEEE organisations

n.a.

Collection results

Environment agency data suggest a collection rate of 29% in 2012, falling to 20% in 2013 **and 19% in 2014, as collection decreased by -5% and POM by -16%.** .

All batteries are exported for treatment. Payments to collectors and processors totalled around EUR 1.5 million. The Fund showed an accumulated surplus of about EUR 1.8 million at the end of 2013.



Source: Environment Agency

Drivers affecting the collection rate

Availability of collection points and use of collection channels

Number of collection points and share of collected batteries:

Collection point host	***Number of collection points****	***Share of total waste battery collection***
Retailers	Not available	
Municipalities		
Schools		
Companies		
WEEE dismantlers		

Awareness creation

Collection boxes by Waste collection companies, CIAK (top row) and FRIS.

Collaboration with schools: Waste collection companies, such as CIAK and FRIS, arrange collection competitions at schools with prizes awarded for reaching certain volumes.

Consumer awareness and disposal behaviour

No surveys available.

CYPRUS

Key points

- The single organisation, AFIS, only began collection in late 2009 and collection facilities at municipalities 'green points' have been delayed and are yet to become fully available.
- **The collection rate climbed from 11% in 2012 to 20% in 2014. Collection volumes increased by an average of 14% annually since 2010 to 51g per capita, while POM declined by an annual average of 12% to a low of 226 g per capita in 2014.**
- Stronger involvement of the central government and local authorities in collection ('green points') and awareness creation (e.g. by way of legal requirement) could potentially improve the collection rate.

Regulatory parameters

Overview

The Solid and Hazardous Waste Management (Batteries and Accumulators) Regulations 2009 were published on 20 March 2009 and came into force on the same day. They were to be complemented by two Decrees, one on registration and one on reporting. However, these Decrees have not yet been published as they required another revision of the 2011 Waste Act which was amended in February 2012 to align the requirements for WEEE and battery organisations with those for the packaging organisation, GDC.

Roles and responsibilities in waste portable battery collection

- **Producers** are responsible for financing waste battery management, including public collection infrastructure, but they may transfer their legal take-back obligation to a collective organisation. The market share obligation was calculated for the first time for 2009.
- **Collective organisations** must be approved by the Ministry of Agriculture (MOA), must be owned by producers and must be not-for-profit organisations. They must provide a financial guarantee and operations must cover the whole country.
- **Municipalities** are not obligated to collect; they currently have no role except for the provision of space for 'green points' that are (yet) to be established by the Ministry of Interior and which include battery collection points.
- **Retailers** are required to take back spent batteries and may return them to wholesalers; there are no de minimis exemptions.

Requirements on compliance organisations

Several organisations operating in parallel is legally possible. Organisations must

- have a permit from MoA
- be owned by producers
- be not-for-profit organisations
- submit a financial guarantee
- cover the whole country

Permission is granted for 6 years. The fees the organisation charges to producers are subject to government approval.

Development of compliance organisations

In November 2007 AFIS, an association of battery importers, commissioned Green Dot Cyprus to operate a battery take-back organisation. Green Dot Cyprus submitted a business plan for approval to MOA in early March 2008 and battery organisation **AFIS** received its approval one year later, on 30 March 2009. A producer complying through AFIS automatically becomes a member of the organisation. Producers can alternatively choose to become shareholders, which gives them the extra right to become members of the Board of Directors if chosen at an Annual General Meeting of the shareholders. AFIS began charging waste battery management fees from 1 May 2009.

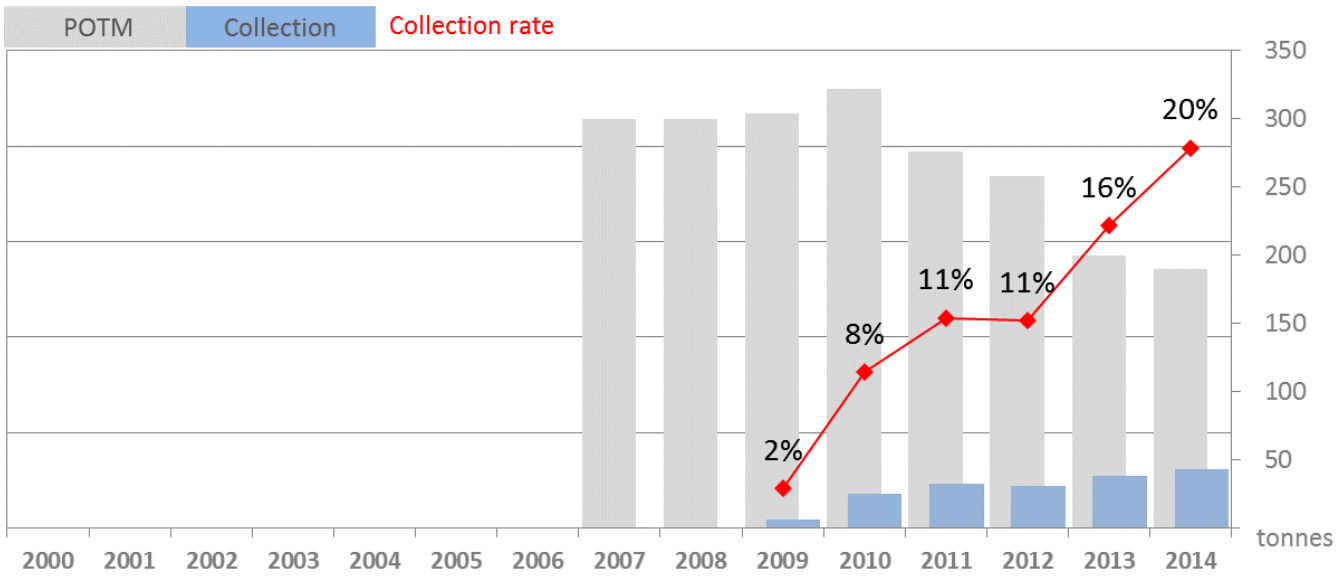
As there is only one organisation, clearing is not required. The Clearing House function would, if required, be assigned to the register managed by MOA.

Interface with WEEE organisations

Battery organisation AFIS is managed by Green Dot Cyprus, which also manages the country's only WEEE organisation, Electrocyclosis.

Collection results

The collection rate climbed from 11% in 2012 to 20% in 2014. Collection volumes increased by an average of 14% annually since 2010 to 51g per capita, while POM declined by an annual average of 12% to a low of 226 g per capita in 2014.



Source: AFIS

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are currently over 2,400 waste portable battery collection points in Cyprus (or one per 390 residents), the majority of which are located in Nicosia and Limassol.

AFIS' collection began as scheduled in June 2009 with the distribution of 250 bins in public and private buildings throughout the Island. By the end of 2012 there were about 2,000 collection containers (end 2011: 1,500) in schools, retailers and supermarkets, municipal and public areas and NGOs.

Only about a fifth of the collected battery volume derives from municipal collection points. This number can be expected to increase once the Ministry of Interior has established 'green points' in municipalities in which certain waste streams including batteries will be separately collected.

Number of collection points and share of collected batteries, 2013 (2012):

Collection point host	*Number of collection points*	*Share total waste battery collection*
Retailers and similar*	886 (855)	40% (25%)
Municipalities	371 (343)	25% (20%)
Schools	658 (608)	12% (11%)
Companies**	647	20% (34%)
WEEE dismantlers	12	3% (5%)

** serviced by compliance organisation directly, incl about 400 banks, hotels*
*** Battery end user other than small commercial and household*
*Source: AFIS * of which 410 banks, hotels, and similar*

Consumer awareness

Awareness creation measures

While there is no minimum spending requirement, the fact that AFIS operates as a single organisation allows adequate spending on consistent consumer awareness measures through all media channels, including TV:

- **Collection boxes** are designed to be eye-catching and informative.

- **Billboards and television campaigns:** AFIS Cyprus billboard campaign ran for six month periods from April 2013 and again from April 2014. During 2013 two TV campaigns (both lasting for about 6 weeks, the first beginning in March and the second in October) introduced consumers to the new AFIS recycling bins and reminded them of separate collection and the location of collection points. Another 6-week campaign followed in April 2014. **As of 2015, posters are on display in various locations within the Mall of Cyprus.**

- **Advertising & printed media:** AFIS Cyprus distributes flyers and brochures to retailers and other collection points. During the 2012 Christmas season, ornaments made from recycled paper were distributed in shopping malls and in various magazines.

- **Events and competitions:** 'Moving Media Campaign'**:** 4 'Smart' cars carried advertisements for AFIS for three months from March 2013. The messages said 'Together for a positive change'. Various educational events are held periodically in public places such as shopping malls. In 2014, a bus was used in addition to the smart cars.

AFIS holds regular competitions and raffles in public locations (such as shopping malls) where prizes are awarded to contestants.

AFIS, Green Dot Cyprus and WEEE organisation Electrocyclosis jointly organize annual 'Environmental Awards' whereby businesses are honoured for environmental protection efforts.

AFIS participates in and co-organises **events**, notably to inform children about battery recycling in funny and interesting ways such as through games or competitions. Schools with the highest performance in battery recycling received awards. **An advertising campaign** was launched in March 2014 in three shopping malls. **In early 2015, AFIS participated in a march during carnival.**



- **Internet and social media campaigns:** AFIS Cyprus communicates through and actively updates their Facebook page. A Facebook App was released allowing users to play an educational game. In December 2013 an online game was launched in which the user is given a mission to build a new city using waste batteries. **In August 2014, AFIS and Green Dot Cyprus released an app which provides information about collection points for waste packaging and batteries. In July 2015, AFIS launched another online game where players are to collect as many batteries as they can to avoid polluting land, air and water.**

Other: Throughout 2013 AFIS sponsored a weekly 'environmental issues'-focused **radio program** entitled "At the yard of Earth", with batteries recycling being the topic of several broadcasts.

Consumer awareness and disposal behaviour

No surveys have been carried out yet.

Accuracy of reporting

Given that all 'producers' are importers of EEE and batteries often without detailed specification of the batteries imported, POM is **reported** in battery units in different weight groups (up to 5 g, 6-30 g, etc.). About 15% of POM declarations to AFIS are audited by external auditors each year. There have been a few enforcement actions by authorities with regards to free-riders.

AFIS collects any dry cell batteries up to 2kg of weight. There are no other initiatives focusing on industrial batteries in Cyprus.

AFIS reports collection volumes to the Government by chemistry.

Potential for improving collection rates

Potential for improving the collection rate is seen mainly in stronger involvement of municipalities and the central government in awareness creation e.g. through legal requirement to participate in campaigns. In addition, there could be clearer requirements on retailers to improve the visibility of collection bins.

CZECH REPUBLIC

Key points

- On the basis of a 2001 voluntary agreement between the Government and industry, Ecobat was the single battery organisation from 2003 to 2009. Under legislation transposing batteries Directive 2006/66/EC, REMA Battery – related to WEEE organisation REMA - was approved as a second battery collection organisation.

- Estimates based on partial data from compliance organisations suggest that collection volume has steadily increased and the collection rate reached 31% in 2013. **In 2014 the collection rate remained at 31% as POM increased by 8% and the collection volume by 6%.**

Regulatory parameters

Overview

Legislation and compliance regarding batteries and accumulators are addressed in **Waste Act 185/2001** whose Article 38 introduces mandatory take-back of waste portable batteries from 1 January 2003. Producers had to organise take-back on their own account, or enter into a contract to delegate this obligation to another legal entity or natural person or use the municipal waste collection service and municipal sorting facilities on the basis of a written agreement with the municipality.

The Ministry of Environment had planned to include the transposition of Batteries Directive 2006/66/EC in a comprehensive review of the Waste Act. A draft released in February 2008 met with strong protests from stakeholders including the Czech Portable Battery Association and retailers who were opposed to taking back batteries at small retailers, such as filling stations and tobacco shops. The final Act then subjected only certain types of shops to the take-back obligation.

To speed up transposition of the Batteries Directive, the Ministry separated the amendment of the Waste Act's chapter on batteries from the other planned amendments and revised it thoroughly. **Act 297/2009 amending the batteries section of the Waste Act** entered into force on 19 September 2009. In May 2010, **Decree 170/2010** provided detailed requirements for battery waste management.

A July 2015 amendment to the Decree introduces comprehensive POM and collection reporting as well as detailed financial disclosure requirements for compliance organisation from 2016.

A draft Act on End-of-life Products, proposed in late 2014, would, if adopted, introduce tighter authorization requirements for WEEE and batteries compliance organisations.

Roles and responsibilities in waste portable battery collection

- Since 19 March 2010 **producers** have had to ensure free take-back of waste batteries by setting up collection points in municipalities with at least 1,500 inhabitants and in which their batteries are sold, as well as on the premises of obligated retailers. Collection, recovery and disposal obligations can be transferred to a **collective organisation**.

- **Retailers** that either have a sales area above 200 m² or fall under one of 14 retail categories [e.g. EEE, watches, etc. but not petrol stations] must, from 19 March 2010, take back waste batteries free of charge and must inform customers about the location of collection points. Collected batteries must be transferred to an entity authorised for processing waste batteries. Wholesalers have no obligation to take back waste batteries.

- **Municipalities** are not required to collect but can request producers to set up collection points.

- **Collective organisations** must be approved by the Ministry of Environment, and be owned by producers as a joint stock company or limited liability company where one single shareholder may not hold more than 33%. Individual organisations are subject to the same requirements as collective organisations, including on collection point density, and in addition they must provide a financial guarantee for 5 years after having placed batteries on the market.

Requirements on compliance organisations

A collective compliance organisation must

- be approved by the Ministry of Environment (approvals valid for 5 years, extendable)
- be a joint stock company or limited company owned by producers
- not have a single shareholder that holds more than 33%
- distribute any profit among shareholders
- only perform activities related to waste batteries
- present a waste management plan including contracts with waste handlers and municipalities
- be open to all producers of all EEE on equal terms
- explain financing methods[83]

Moreover, the operator of a collective compliance organisation may not engage in the business of its members.

Development of compliance organisations

In response to the Waste Act 2001, six of the eight members of the Czech Portable Battery Association (CPBA)[84] founded **ECOBAT** in 2002. Ecobat's operations at the time were based on a voluntary agreement signed on 13 December 2001 between CPBA and the Ministry of Environment, which specified the establishment of a general collection organisation with a collection target of 120 tonnes in 2002 and 1,000 tonnes (100g per capita) in 2006 (both missed) and a recycling target of 10% and 50% respectively.

[83] §31g of the Waste Act requires a financial guarantee only from individually or jointly complying producers

[84] CPBA was founded by eight companies in 1999 with the objective of preparing for the introduction of EU battery legislation (in 2005, CBPA members were Slaný CZ, EMOS, Energizer CZ, Gillette, Panasonic, Sanyo Energy, Sony, Varta). On a related note: In February 2002 EPBA launched the REBA initiative, based in Poland, to bring about synergies in start-up costs for battery collection and recycling in the Czech Republic, Hungary and Poland. However, in 2003 REBA decided to limit its geographical scope to Poland as legislation in the three countries was too different – Poland has binding recovery and recycling targets, the Czech Republic has no targets and Hungary was still developing its legislation. Also, Poland's recovery and recycling targets are so ambitious in relation to the existing collection infrastructure that REBA wanted to focus its resources there.

Ecobat remained the only organisation to provide a collective take-back organisation until December 2009 when, under the 2009 Waste Act, the Ministry of Environment approved Ecobat and a second battery compliance organisation, **REMA Battery**, the sister organisation of WEEE organisation REMA, which itself was set up by importers of IT and consumer AV equipment[85] in February 2005. **Ecobat's share of POM was 90% in 2013, while its collection share was 93%,** with REMA Battery responsible for the remainder. Ecobat has about **732** members, REMA about **400**. **There is one individual complier, Goldtime, a watch distributor (POM: 300kg).**

Market shares and clearing for over- and under-collection

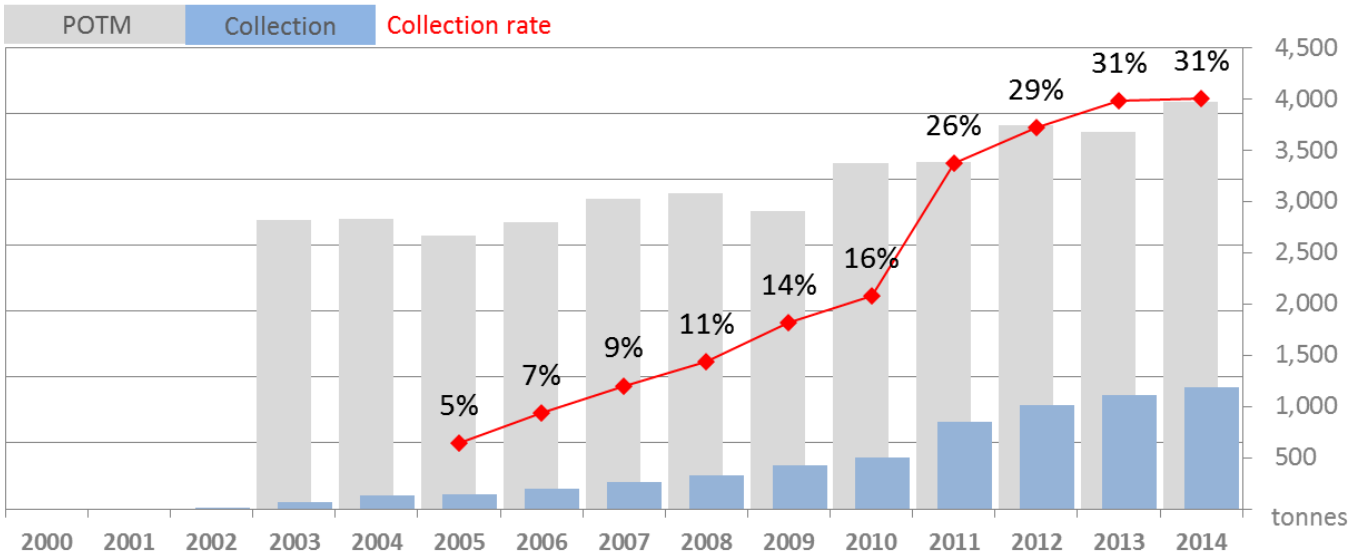
The Czech Republic is one of the few eastern European countries without a product fee penalty payment mechanism for underachievement of the collection targets. However, a clearing mechanism may not be necessary as there are only two organisations that can agree on clearing for over and under-collection bi-laterally.

Interface with WEEE organisations

ECOBAT receives batteries removed from WEEE by WEEE organisations Asekol, Elektrowin and Retela, while REMA receives the batteries removed from WEEE collected by its sister WEEE organisation. As there is no clearing mechanism between WEEE organisations[86], imbalances from WEEE collection might be passed on to batteries (Asekol data suggest a collection/POM ratio of 64%, far above the average of around 30%).

Collection results

The data used here cover only Ecobat up to 2009 and for later years assume that the share of REMA Battery, the other battery organisation, is 10% (based on REMA's share of collected WEEE). This suggests a collection rate of 29% in 2012, increasing to 31% in 2013 as nominal collection volumes increased. **In 2014 the nominal collection volume increase by 6% but the collection rate remained at 31% as POM increased by 8%.**



[85] eD'organisation, Konsigna Handel, AT Computers, AAC Czech, EDS, SOFTRONIC Praha, LEVI INTERNATIONAL

[86] Six WEEE organisations had prepared to compete but in December 2005 the Ministry of Environment selected only one organisation for each category of historical WEEE (however, the Ministry did allow several organisations for new WEEE). In practice, the Ministry's decision was ignored: the unapproved organisations collected about 20% of all WEEE and sued the Ministry of Environment, challenging the 'one-organisation' clause on competition grounds. In August 2010 – after lengthy legal battles – the Supreme Administrative Court ended the dispute by finding procedural faults in the Ministry's organisation selection process.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 16,910 waste portable battery collection points in Czech Republic, or about one per 620 residents.

Number of collection points and share of collected batteries, 2013:

Collection point host	*Number of collection points*	*Share total waste battery collection*
Retailers serviced by organisations	7,500	26%
Municipalities	4,400	11%
Schools	3,400	14%
Companies	1,600	39%
WEEE dismantlers	40	9%

Source: Ecobat 2012, own estimates

Consumer awareness creation

ECOBAT

Ecobat runs a full range of awareness creation measures:

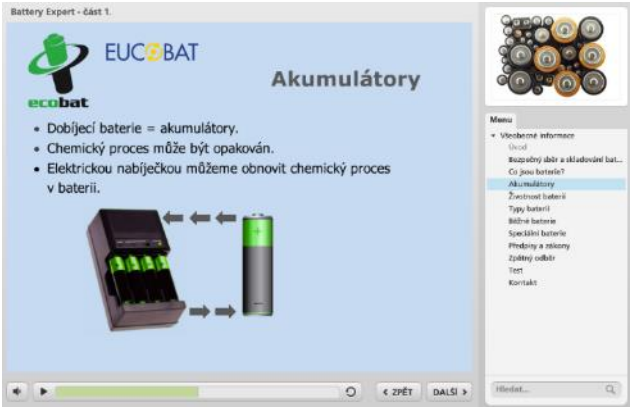
- **Collection boxes:** ECOBAT has released multiple collection box designs. A collection box for households, entitled 'Ecocheese', was launched in spring 2011. It comes in 4 different colours (pink, green, blue and aqua/teal), **3 different sizes (small, medium and large**) and contains holes of different sizes for various batteries. They can be ordered free of charge online and once full, pick-up can be requested.

2015:

- **School programmes & events:** Under ECOBAT's 'school recycling programme', schools can compete for points based on volumes collected. Over 3,000 schools participate. Additionally, educational events tour around participating schools and public areas, where a large frog and hedgehog conduct fun games and recycling activities.


- **Internet & social media:** **Ecobat's website features interactive e-learning tool 'Battery Expert'. It provides videos explaining i.a. batteries and their composition and the processes involved in their treatment.**

2015:



REMA

Due to its origin as a WEEE organisation, REMA can be assumed to derive most batteries from WEEE dismantlers. The design of its battery collection boxes is simpler.

2015:

- **Campaigns:** **In 2011 REMA launched a project entitled BUĎ LÍNÝ ('Be Lazy') which offered to pick up WEEE and waste batteries directly from households nationwide. Take back requests were placed either online (www.budliny.cz) or by phone. Similar campaigns were launched in 2008 ('Green Company' and 'Green School') whereby businesses and schools were given collection boxes for WEEE and batteries.**

Consumer awareness and disposal behaviour

From late 2013 to early 2014, an 'inventory project' involving 7,000 households found 49 portable batteries in the average Czech household: 33 portable batteries were contained in 17 EEE appliances, and of the remaining 16 batteries half were new and the other half used. This is four times the amount that consumers estimated to have in their home (12.7 batteries) in a study for ECOBAT in 2012.

The 'inventory project' was organised by 'Recycling Games' (**FB link**)', an organisation promoting environmental education (in over 3,000 schools) that was co-founded in 2008 by compliance organisations Asekol, Ecobat, Ecolamp and Elektrowin, and operating under the auspices of the Ministry of Education. For the project, primary and secondary school students were given the task of counting the batteries in their homes.

Accuracy of reporting

The POM volumes lost due to free-riders are unlikely to be significant: After ECOBAT signed agreements with WEEE organisations Asekol, Elektrowin and Retela to represent their members (who had previously escaped the battery take-back obligations) Ecobat's membership increased from 135 in 2008 to 660 in 2011.

POM reports and re-processing reports must be broken down by chemistries **for all battery types**, which allows the Government to conduct detailed plausibility checks of the reported POM and collection data, **and - from 2016 - also of collection sources and detailed financial data of the operations.**

DENMARK

Key points

- From the mid-nineties, a municipal collection system for NiCd batteries was financed by producers. Since September 2009, municipalities have been responsible for collection of all portable batteries (financed by a tax on producers of DKK 2,750 (EUR 370) per tonne put on the market) while two battery compliance organisations take back waste batteries from municipalities and from voluntarily-collecting retailers and other organisations. Organisations also finance and organise public awareness creation measures.

- **The collection rate for all portable batteries declined from a high of 47% in 2011 to 41% in 2013 and increased to 45% in 2014. Annual fluctuations of around +/- 15% for POM and +/- 8% for collection volumes have been common.** Over 90% of waste batteries derive from municipal collection points. Retailers are not obligated to take back waste batteries.

- The Government's resource strategy of November 2013 anticipates a minimum portable batteries collection rate of 55% by 2018.

Regulatory parameters

Overview

The **Environmental Protection Act of 1991** required manufacturers and importers *inter alia* to maximise product life and recyclability and empowered the Environment Minister to make agreements with industry sectors on take-back arrangements. In the same year, the Ministry of Environment made a voluntary agreement with the association of importers and retailers of rechargeable batteries with the aim of achieving a collection rate of 75% for NiCd batteries. When this target was not reached (a collection rate of only 35% was achieved), the voluntary agreement was terminated and Amendment Act 397 of 1996 on lead and nickel-cadmium accumulators imposed a tax on producers and importers of DKK 6 (EUR 0.80) per cell (built together button cells or flat packs) and DKK 36 DKr (EUR 4.80) for battery packs (though at least DKK 6 per cell). Approved collecting enterprises were paid DKK 150,000 (EUR 20,000) per tonne collected and treated.

Amendment Act 509 of 2008 transposed key provisions of Batteries Directive 2006/66/EC, by requiring manufacturers and importers of portable batteries *inter alia to fund the municipal collection* of waste portable batteries through a tax of DKK 2,750 (EUR 370) per tonne of portable batteries put on the market from January 2009.

An **amendment to the Environmental Protection Act** of December 2011 doubles the tax paid by producers for municipal collection of waste portable batteries from DKK 2.7 to DKK 6 per kg (EUR 804 per tonne) from 1 January 2012. The Government deemed the increase necessary to reflect municipalities' actual battery collection costs (about EUR 1,800 per tonne collected) and to recoup, by 2015, the losses that municipalities incurred in 2009/10 due to the insufficient level of tax. (In 2010, producers were taxed EUR 1.1 million to pay for collection by the municipalities, while the latter claim their actual collection costs were EUR 2.8 million.) Ordinance 943/2008 transposed the single market provisions of the Directive, and a further amendment (143/2013) transposes the requirements of EU Regulation 1103/2010 on capacity labelling.

Several Government Ordinances regulate details of waste batteries management. **The latest, published in July 2015, transposes Council Directive 2013/56/EU, and i.a. requires EEE producers to design equipment in such a way as to allow easy removal of waste batteries by parties independent of the manufacturer and to provide removal instructions.**

The Government's resource strategy paper '**Denmark without waste – Recycle more, incinerate less**' of November 2013 anticipates a minimum portable batteries collection rate of 55% by 2018. This should be achieved by making the return of

obsolete EEE 'simple and easy'. Moreover, a 'partnership for collection', involving manufacturers of EEE and batteries should identify the fractions on which increased collection should focus. Improved treatment of WEEE and batteries (better separation and recycling of shredded waste) should increase the recycling of metals. Finding the right treatment option is vital especially in view of end-of-life e- and hybrid vehicles as these contain large volumes of electronics and will be included in shredder waste.

Roles and responsibilities in waste portable battery collection

- **Municipalities** must establish easily accessible collection facilities and register these with the clearing house, DPA organisation.

- **Producers** must finance the municipal collection of waste portable batteries through a tax of about EUR 370 per tonne put on the market payable from January 2009. In addition they must finance – individually or collectively – the take-back and treatment of waste portable batteries from municipal collection points. Individually-collected amounts can be deducted from the collective obligation. They must also finance information campaigns with an information value equivalent to the amount they place on the market.

- **Compliance organisations** can assume the legal take-back obligation of producers. If they fail to meet the obligations, responsibility falls back onto individual producers.

- **Retailers and distributors** may take back batteries and if they do so it must be free of charge.

- **DPA-System** (Danish Producer Responsibility Organisation, known as WEEE-Organisation until 2009) acts as **clearing house** and allocates pick-up of waste batteries from municipal collection to collective organisations based on market share and geographical criteria (mainly population covered and density of collection points).

Requirements on compliance organisations

Collective organisations are mentioned in the legislation in the context of producers' ability to transfer obligations. The only legal Requirements on compliance organisations are that they are registered with DPA-System and that they offer the same conditions to all producers. If a collective organisation fails to meet the obligations, responsibility falls back onto individual producers.

For individual compliance organisations, no requirements are laid down in legislation. DPA-System guidance recommends that producers of portable batteries join a collective organisation due to the extensive administration, logistics and communication requirements.

Development of compliance organisations

Prior to 2009 only producers of lead and nickel-cadmium accumulators paid a tax on batteries while municipalities managed the collected batteries themselves. Since 2009, producers of all portable batteries have been subject to the tax. In addition, they join one of the three WEEE organisations to take back waste batteries collected by municipalities:

- Elretur, founded in 2005 as a not-for-profit WEEE organisation by industry association Dansk Industri, consumer electronics organisation BFE, the association of manufacturers and importers of household appliances FEHA and three other industry associations. Each of these provides a member of Elretur's board of directors, with six others

elected from the member companies. Operations: Elretur began operations in April 2006. It relies on a network of 380 municipal WEEE collection points.

- **ERP Denmark** (formerly **NERA** - Nordic Electronic Recycling Association) was initiated by ERP members and recycler Stena Technoworld. In June 2008 Nera became part of the ERP network. Members: for WEEE: Sony, Westheimer, Hewlett-Packard Nordisk Film, Sony Ericsson, Elgiganten, Canon, Proctor & Gamble, MNP and Dell. By September 2008 about 10 companies had registered.

- **RENE AG** (formerly RE-DK) **s**et up as RE-DK in early April 2006 by German-based RENE AG and H J Hansen Elektromiljø A/S.

Elretur is the largest organisation with a market share of around 70%. The smallest, RENE, outsources take-back operations to ERP. In 2009, Stena Miljø took back waste batteries from all of Denmark's administrative districts[87], in 2 of them on behalf of ERP, in the rest on behalf of Elretur.

Market shares and clearing for over- and under-collection

DPA-System, was mandated by the 2005 Environment Act as the register and clearing house for WEEE, and from January 2009 also for batteries and packaging. DPA-System's seven board members are industry representatives[88] appointed by the Minister for the Environment.

DPA-System allocates collective and individual organisations to municipal collection points, taking into account market shares of the organisations per collection group (WEEE collection groups as well as batteries) and geographical criteria. It is then the collective organisations' responsibility to inform municipalities about which contractors will operate each collection point per fraction. DPA-System's allocation is adjusted annually for over- and under-collection[89]. The first battery allocation ran from 1 September 2009 to 31 May 2010. During this period only, all organisations used the same collector (Stena Miljø).

DPA-System's costs of about EUR 550,000 – 750,000 per year are covered by fees paid by obligated producers based on the amount they place on the market (producers pay about EUR 9 per tonne of portable batteries put on the market, B2C EEE producers about EUR 4 per tonne).

Interface with WEEE organisations

The clearing mechanism above can use collected waste portable batteries to adjust for any over- or under-collection that may result from imbalances of batteries removed from WEEE.

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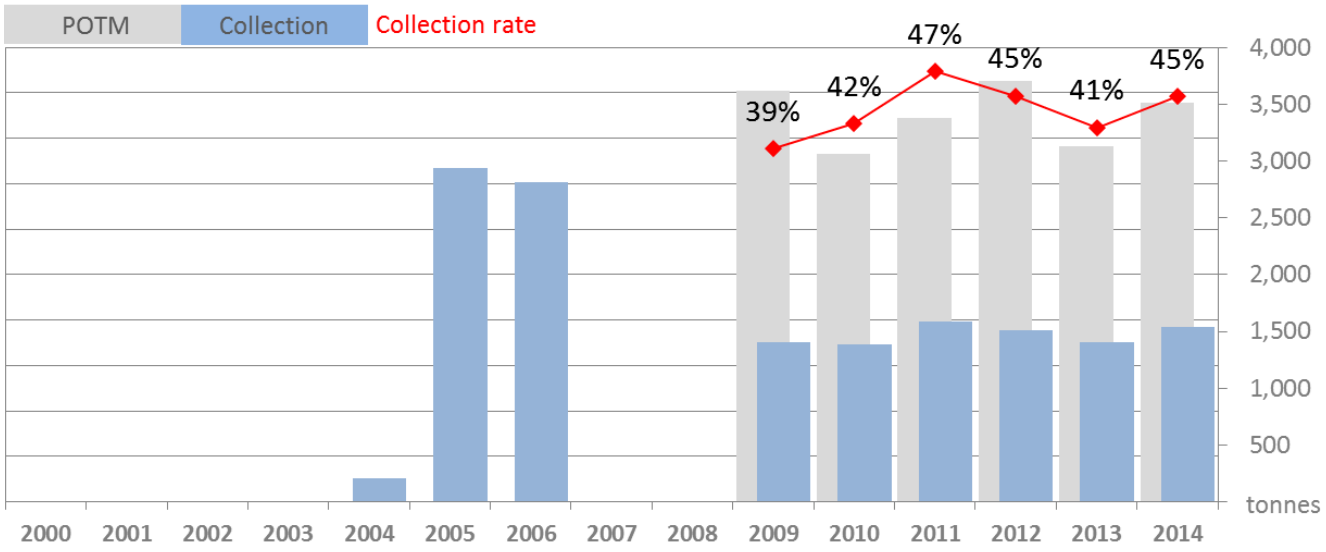
87 Note: Since September 2009, the three collective organisations have contracted five waste management companies to take back B2C WEEE from the collection points of Denmark's 99 administrative districts: **HJ Hansen** (collection fraction 1, 2); **Stena Technoworld**; **Stena Miljø** (100% of lamps and batteries); **DCR Miljø** (fraction 3 and 4) and **Averhoff** (fraction 3 and 4).

88 One each from Confederation of Danish Industries (DI), Danish Chamber of Commerce, Battery Association, Danish Car Importers Association, VELTEK and FABA, Association of Manufacturers and Importers of Domestic Electrical Appliances (FEHA)

89 **DPA Guidance** of July 2010, updated October 2011, on the allocation scheme notes that DPA-Organisation allocates collection sites from neighbouring municipalities to producers (respectively WEEE organisations) for each collection group. As market shares of producers the organisations represent vary, several organisations may serve the same municipal collection point. The guidance includes formulas for adjustments to take account of errors in previous years' reporting or deficient registrations.

Collection results

From 1997 – 2001, the municipal collection organisation for NiCd batteries had achieved collection rates of 48%-79% for these batteries. **The collection rate declined from a high of 47% in 2011 to 41% in 2013 and increased to 45% in 2014. Annual fluctuations of around +/- 15% for POM and 5% to 10% for collection volumes have been common.**



*Source: Data after 2009: **DPA organisation***

An academic paper, 'WEEE and portable batteries in residual household waste', released in May 2013, is based on the analysis of 26 tonnes of residual waste from 3,129 households (of which 2,272 single person households) in 12 Danish municipalities in 2011. The study found that the average household[90] disposed of incorrectly (with residual household waste) per year [91]:

- **1.5 kg or 7 units of WEEE - mostly small WEEE - electric tooth brushes, watches, clocks, headphones, flashlights, bicycle lights, and cables.**
- **208 g or 9 units of batteries - of which 20% in WEEE and mostly primary alkaline, carbon zinc, alkaline button cells. The amount corresponds to 39% of WEEE corrected in proper channels.**

In view of the impact of collection approaches used by municipalities, the study had identified a 'full service system' (including bag or box for each household) and 'public collection points'. However, despite large variations between the two, their impact on the data could not be proven. This justified treating both collection approaches as one sample.

In June 2014, the MoE released the study **'Best practice for waste battery collection in municipalities'** which investigates the costs of effectiveness of 5 collection approaches based on details provided by authorities in 11 municipalities. **Key finding included:**

90 **Based on Danish household size distribution, we estimate the sample of the study to cover 9,800 residents. On a per capita per annum basis, the findings thus translate into 486 g of incorrectly disposed WEEE and 67 g of incorrectly disposed batteries in 2011.**

91 **The study provides weight per week and units per year (WEEE 29 g/week, 7 units/year; Batteries 4 g / week, 9 units / year, Toner 1 g / week, cables 7 g /week)**

- **As regards the effectiveness of five types of collection approaches used by municipalities (all municipalities used several approaches), the closeness of the approach to the resident is found to be key: 'Environmental boxes' distributed to each household to collect hazardous waste including batteries which are returned to hazardous waste collection points and 'Battery bags' distributed to households which residents can dispose of by placing them on top of residual waste bins appear to be the most effective options.**

- **Information measures are key to collection costs: Municipalities with low collection costs had either a separate battery collection plan in place, unchanged for a long time and with little need for new information or have made little effort to collect batteries.**

- **The Batteries Directive (Art. 8) and WEEE Directive (Art.5) place 'almost identical' requirements on the collection network (end-users must be able to dispose of the waste products in easily accessible collection points, having regard to population density. A different implementation of the two therefore 'does not seem appropriate'.**

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 400 municipal collection points in Denmark or one per 14,000 residents, where waste portable batteries are collected alongside other problematic or bulky waste from residents, small companies and most retailers. These collection points contributed about 91% to the collected waste battery volume in 2011, 94% in 2013. Most of the remaining waste batteries derive from the WEEE compliance organisation. While nominal waste battery collection volumes of all collection sources have been on the decline since 2011, volumes derived from WEEE halved between 2011 and 2013.

Number of collection points and share of collected batteries, 2013 (2011):

Collection point host	***Number of collection points***	***Share total waste battery collection***
Retailers serviced by organisation**		2%
Municipalities	400*	94% (91%)
Schools		n.a.
Companies**		included in retailers
WEEE dismantlers***		4% (8%)

Source: DPA

** Registered with DPA*
*** Collected by obligated producer directly*
**** Collected by WEEE compliance organisations*

Consumer awareness creation

Supporting legal requirements

Amendment Act 509 of 2008 requires producers of portable batteries to finance information campaigns with an information value equivalent to the amount they place on the market:

- less than 1 tonne: organise public awareness campaigns of an information value corresponding to at least A4 leaflets provided through the retailer
- From 1 to 10 tonnes: conduct public information campaigns of a value equivalent to an A3 advertisement in a national newspaper or similar once a year.
- Over 10 tonnes: conduct information campaigns of equivalent value to a half page advertisement in a national newspaper or similar for each 10 tonnes marketed.

The EPA may waive the above if several producers marketing at least 1,000 tonnes conduct a joint campaign that the EPA considers equivalent. However, this has not happened and the organisations run campaigns separately:

Elretur

- **Farewell battery** site allows end-users to find the nearest battery collection point.

- **School quiz campaign Batterikampagnen:** Elretur runs nation-wide educational campaigns in schools with the help of sponsorship. Students are educated on how to use batteries, what they contain and why they must be recycled. Classes can take part in an online web-based quiz **Remix your batteries**. Prizes are awarded monthly. Classes answering correctly participate in the draw for which the first prize is DKR 8,000 (EUR 1,075), the second movie tickets for the whole class. The teachers' staffroom of the school with most classes answering correctly is also rewarded (e.g. with a coffee machine or sweets).

ERP Denmark

In 2013, ERP Denmark developed a set of three TV commercials entitled 'Giv brugte batterier nyt liv' (Give batteries a new life) in collaboration with YMCA Scouts (video **1**, **2**, **3**)

ERP Denmark is organising a battery campaign and events in collaboration with YMCA scouts using **facebook** as the primary communication channel. On **Batteriindsamling**, EPR Denmark i.a. provides information about collection point locations in Denmark.

In 2015, ERP launched the app 'ERP Green Challenge' which helps citizens locate their nearest WEEE and battery collection points.

Accuracy of reporting

Clearing house DPA-System prepares detailed annual statistics for each waste stream it oversees. POM volumes of all battery types are recorded by lead, nickel cadmium and other chemistries. However, a breakdown of collection volumes into these chemistries is not available by battery definition (portable, etc.) but only for all battery types combined, since all battery types are collected together and the sorting follows the treatment method (by chemistry).

In its 2011 report DPA notes in '**Definitions and issues affecting data quality'** that it 'has been a general problem to secure data quality' from both producers and municipal collection sites. DPA-System therefore continuously implements measures to improve data quality, including linking the registration and reporting organisation to the Central Business Register (CVR) and conducting regular comparisons of DPA's register with CVR data. A notification organisation informs all relevant players automatically about deadlines and defective reports. Despite this, DPA notes that issues affecting statistics remain: As regards POM data, in particular the unit-to-weight conversion factors that one organisation applied until 2010 caused fluctuations of the reported weight volumes. With regard to municipal collection data, there is concern about late updating of registered collection sites and volumes collected.

The requirement for producers to report to tax authority SKAT – which shares its data annually with DPA – also helps to verify POM reports. DPA notes that 'it has turned out that some producers have registered for producer responsibility with DPA-System, but have not reported data to SKAT' or vice versa, and that the double reporting may lead to poorer data quality. This may explain the fact that 'portable batteries are the only type of batteries not having seen an increase in quantities placed on the market'. [The high percentage of button cells in portable batteries POM (30% vs. below 1% elsewhere) suggests challenges with the 2011 POM report].

A January 2014 **DPA guidance document on the batteries scope** provides *inter alia* these interpretations:

- The term portable is interpreted as having a weight and shape that 'easily fits into a person's hand'.
- Electric vehicles and wheelchairs, e-bicycles, airport vehicles and other automatic transport vehicles (e.g. electric scooters, Segways, water scooters, forklifts and trucks) - batteries for these applications are industrial batteries.
- Big electric toy cars and motorcycles (comment: which children can ride), as well as motorised carts for golf clubs, are not considered electric vehicle for passenger transport (thus their batteries are portable batteries).
- A battery that was originally developed for industrial purposes, but subsequently also used for non-commercial purposes, may NOT be reported as an industrial battery.
- If a portable battery is included in a battery pack that is produced exclusively for industrial purposes, the entire pack is to be reported as industrial batteries.

ESTONIA

Key points

- Separate collection for portable batteries has been in place since the end of the 1990s. Batteries could be returned free of charge to around 100 hazardous waste collection points managed by the municipalities. Since May 2004, producers have been legally responsible for waste portable batteries. However, there were no compliance organisations available until 2009, when two WEEE management organisations - EES-Ringlus and Elektroonikaromu - were approved as waste battery organisations.

- From 2011 to 2013 the collection rate more than doubled (from 18% to 39%) **but dropped to 22% in 2014**. POM volumes of portable batteries **(449 g in 2014)** remains about double that of neighbouring LT, LV and PL.

- The collection rate could potentially be improved by a central coordination of or measureable requirements on awareness creation measures and collection campaigns by the competing schemes.

Regulatory parameters

Overview

Producers have been legally responsible for waste portable batteries since May 2004. However, there were no compliance organisations available until 2009. On 14 August 2008 Estonia published a set of **Regulations** transposing Batteries Directive 2006/66/EC. The new regulations complemented the producer responsibility legislation for batteries that was already in place. Notably, the regulations require battery producers to organise (individually or jointly) nationwide media campaigns, at least once a year, to raise public awareness of the need for separate battery collection by 1 January 2009 and requires retailers to display signs (at least A4 size) identifying collection points. Although retailers had been required to inform consumers under the previous legislation, this had not been put into practice. Later amendments introduced minor changes.

Roles and responsibilities in waste portable battery collection

- **Producers** are responsible for collection and treatment of waste portable batteries including those on the market before 1 May 2004 and – from July 2010 – must supply retailers with battery collection boxes.

- **Collective compliance organisations** must have an approved waste plan.

- **Retailers** must collect any WPBAs free of charge –whether a new battery is purchased or not – in containers to be provided by producers. They may return collected WBPAs to **wholesalers** or producers. [note: Retailers must take back WEEE on a 1:1 basis and - if there is no return facility within a radius of 10 km - without selling new EEE.]

- **Municipalities** are not obligated to collect, but may rent their collection infrastructure to producers (who put containers there) on a non-discriminatory basis.

- There is no **Clearing House**. Producers are now encouraged to trade over- and under-collected amounts and turn to the courts if they cannot reach agreement. The organisations' **market share** was to be calculated for the first time in 2011

Requirements on compliance organisations

The same requirements as for WEEE organisations and other 'products of concern' apply. Organisations must

- be not-for-profit
- have at least 2 shareholders that are obligated producers
- provide membership for producers on transparent and equal terms
- be financed by producers who have transferred their obligations
- purchase services based on free competition
- make data related to waste collection and recovery available to the Ministry of Environment
- establish at least one collection point in each of the 15 counties

Development of compliance organisations

The two WEEE management organisations EES-Ringlus and Elektroonikaromu were approved as waste battery organisations:

- **EES-Ringlus** – set up by three Estonian industry associations, ITL (Association of Estonian Information Technology and Telecommunications Companies), the Union of Traders and CECED Estonia in May 2004 with the aim of forming a WEEE compliance organisation. In 2009 *Nine* of EES-Ringlus' 99 members requested the take-back of batteries, corresponding to an estimated 80% of the market share in portable batteries, and waste battery collection started on 26 Sept 2008.
- **Elektroonikaromu** – set up as a not-for-profit WEEE organisation by two producers (the legally required minimum for WEEE organisations) in August 2005. By April 2006 it had 15 EEE importers or producers as clients. It shares its director with Eesti Pakendiringlus which was set up in May 2004 as a packaging compliance organisation. It is also associated with a tyre collection and recycling organisation. Elektroonikaromu has collected batteries through WEEE collection points since 2005 and at retailers since spring 2008.

Market shares and clearing for over- and under-collection

The 2004 WEEE Collection Regulation did not specify collection targets. Hence a clearing house would be necessary to ensure that organisations collected WEEE and batteries according to their market share. However, the Ministry made it clear in 2006 that it would not act as a clearing house but would leave it up to the organisations to find a solution to adjust for over- and under-collection or revert to a court for arbitration.

Despite the lack of targets, there has been strong competition for collection of WEEE because a February 2007 amendment of the Waste Act stipulated that a organisation which collects more than its share is to be compensated by the other organisations.

In 2007 Elektroonikaromu estimated that its share of products placed on the market was about 10% while its share of WEEE collected through collective organisations was about 40%. However, it did not benefit from the over-collected amounts because it failed to obtain validation for them from the register. A lawsuit concerning reimbursement for over-collection is on-going.

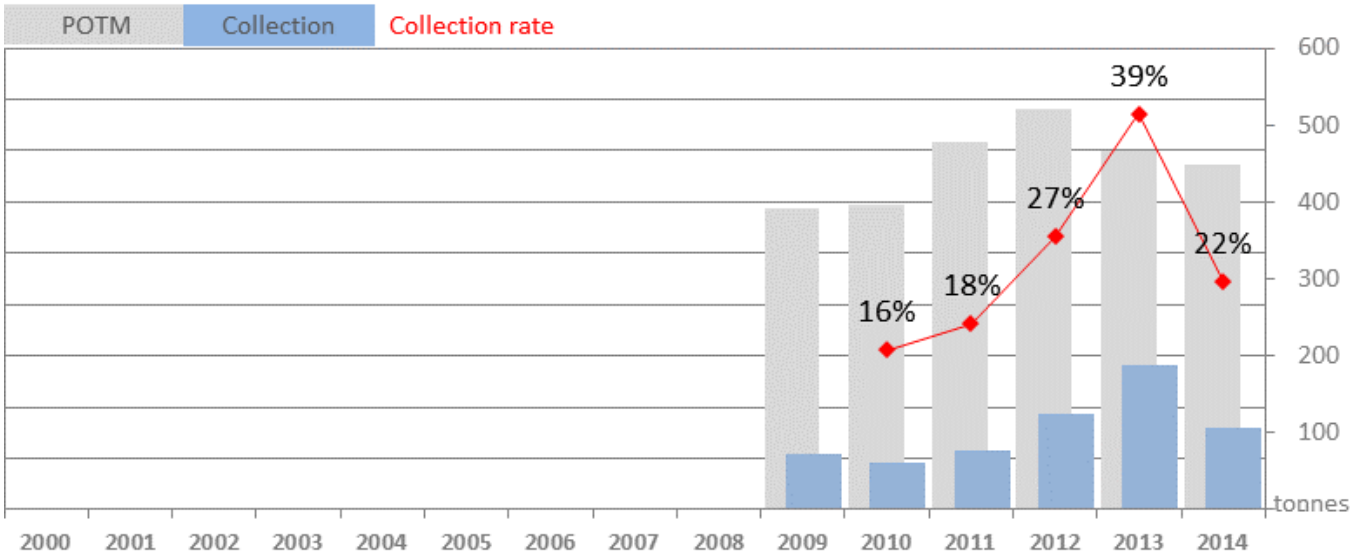
EES-Ringlus has been strongly advocating trading on a monthly basis of quantities collected according to five collection categories (used elsewhere in Europe). This would allow treatment and recovery standards to be controlled. It also believes that the current organisation distorts the market: municipal collection points are often outsourced to waste management companies (for example Eesti Keskkonnateenused, Ragn-Sells, Kesto etc.) who offer collected WEEE to the highest bidder, irrespective of WEEE share obligations.

Interface with WEEE organisations

Both battery organisations are also WEEE organisations.

Collection results

The collection rate more than doubled between 2011 and 2013 (from 18% to 39%) **but dropped to 22% in 2014**. POM of portable batteries declined from 520 g per capita in 2012 to 466 g in 2013, but remains about double that of neighbouring LT, LV and PL.



Source: EES-Ringlus, various, from 2012: MoE

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 1,800 waste portable battery collection points in Estonia, or one per 750 residents:

Municipal collection points and retailers contribute around 40% each.

Number of collection points and share of collected batteries, estimate 2013:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers	1,500	45%
Municipalities	80 (EES Ringlus)	40%
Schools	100 (EES Ringlus)	3%
Companies		5%
WEEE dismantlers		6%

Source: estimate based on partial data from organisations

Consumer awareness creation

Supporting legal requirements:

Battery producers must organise (individually or jointly) nationwide media campaigns, at least once a year, to raise public awareness of the need for separate battery collection. Retailers must display signs (at least A4 size) identifying the collection points for batteries.

However, there is no mechanism to ensure nationwide coordination of consumer awareness measures between the organisations, which is seen as affecting consumer behaviour negatively and gives rise to unfair competition.

In addition, municipalities are required to establish waste management rules in their jurisdictions which also cover batteries management and which should include information on waste collection (to be provided in local media e.g. information boards in stores, local newspapers, websites etc.).

EES Ringlus

- **Collection boxes and in-store promotion:** Boxes are provided together with stickers for floors/walls. Awareness campaigns are conducted in larger shops.

- EES Ringlus uses television, outdoor advertisements, internet, points of sale, customer magazines and radio media to reach the public. An earlier campaign entitled “Useless electrical equipment gaining power – take it to the collection point now and return old batteries to the store” was repeated in 2013.

Elektroonikaromu

- **Collection containers:**

Consumer awareness and disposal behaviour

EES Ringlus, in cooperation with Tallinn University of Applied Sciences, conducts regular 'Environmental Awareness' surveys. Key results of the 2012 **survey** of 1,300 people which focused only on batteries and the 2013 **survey**:

- 72% (2013) of respondents claim to sort their waste
- 95% of respondents were aware of free in store return possibility for waste batteries (2011: 66%; 2012: 82%)
- 84% of respondents claimed to have returned waste batteries (2009: 52%; 2012: 60%) at least once a year, 11% at least once each quarter
- 42% (2012) admitted to having disposed of waste batteries with mixed household waste (2010: 57%).

Accuracy of reporting

Producers must report POM volumes by battery type as well as whether they are chargeable or non-rechargeable batteries, but not by chemistry, as producers are exclusively importers with little information on chemistries.

There have been some enforcement actions by authorities regarding free-riders but no audits of submitted reports.

Reporting requirements for collected batteries are more detailed and break down primary and secondary batteries as well as chemistries.

Potential for improving collection rates

Potential for improving the collection rate is seen foremost in

- improving the effectiveness of battery awareness campaigns by creating a level playing field for organisations by e.g. introducing a measurable minimum spending requirement for battery awareness campaigns or establishing a coordination body
- improving effectiveness of battery collection by establishing a central body coordinating collection efforts by the organisations
- enforcement or incentives for retailers to improve the visibility of collection boxes.

FINLAND

Key points

- Though producer responsibility for batteries containing mercury, cadmium and lead has existed since 2004, take-back organisations were set up only under legislation transposing Batteries Directive 2006/66/EC. Since 2009, two producer controlled organisations, Recser and ERP, have been approved as battery organisations. Recser alone manages waste battery collection and awareness campaigns whose costs are shared between the organisations.

- **The collection volume increased by 18% in 2013 and 10% in 2014, while POM decreased by -2% in both years. The A collection rate moved from 33% in 2012 up to 46% in 2014.** Before producer responsibility legislation the collection rate had been approximately 15%.

- The retailer take-back obligation plays an important role as municipalities have no obligation or right to collect waste batteries. Explicit requirements on retailers to improve the visibility of collection boxes could help improve collection. Stricter enforcement against free-riders would generate more funds for awareness campaigns.

Regulatory parameters

Overview

Though producer responsibility for batteries containing mercury, cadmium and lead has existed since 2004, no take-back organisations were set up under the previous legislation. Batteries Directive 2006/66/EC was transposed through a **2008 amendment to the Waste Act** that subjects batteries to producer responsibility obligations from 1 May 2008, and an **Ordinance on Batteries** stipulating substance restrictions, labelling, registration and reporting requirements from 26 September 2008. A new **Waste Act, 646/2011,** in force since May 2012, most notably addresses the 'ownership of wastes' subject to producer responsibility, by not allowing parties other than producers to manage these wastes unless they do so in collaboration with producers. A new Decree on Batteries (520/2014) was adopted in July 2014 to bring waste batteries legislation in line with the recent Waste Act and the new WEEE Decree. The new Decree i.a. set minimum requirements as regards collection points and revised producer registration and authorisation procedures for compliance organisations. **The Decree was amended in February of 2015 banning all batteries containing more than 0.0005% of mercury by weight.**

Roles and responsibilities in waste portable battery collection

- **Producers** are responsible for collection and treatment according to market share.

- **Retailers** must take back batteries from end-users free of charge without obligation of purchase. Wholesalers are not obligated to take back waste portable batteries.

- **Collective organisations** must be approved by the Pirkanmaa Centre for Economic Development, Transport and the Environment and must offer a nationwide collection network. [Collective organisations will buy services from municipal collection points and build up a collection network at retailers]. From May 2012, organisations must be wholly controlled by producers and must have the means to finance operations for at least six months.

- There is no **clearing house** but the Government may require certain organisations to cooperate to ensure the overall functioning of the collection infrastructure.

- **Municipalities** have no right and no obligation to collect products subject to producer responsibility but some allow organisations to place containers at municipal collection sites.

Requirements on compliance organisations

Producers may transfer their waste management obligation to an approved and registered **collective organisation**. A organisation must be

- wholly controlled by producers
- take equal account of other economic actors when procuring services related to re-use and waste management of products.
- have the means to finance operations for at least six months (no upper limit is set for reserves)
- submit financial and operational plans annually to the Centre for Economic Development, Transport and the Environment for Pirkanmaa

The Government may require certain organisations to cooperate to ensure among other things the overall functioning of the collection infrastructure.

Development of compliance organisations

About 500 producers comply through two collective organisations, Recser and ERP, but Recser alone manages the waste battery collection operation for both organisations.

During the run-up to the registration deadline in September 2008, retailers strongly supported a single collective organisation for batteries, while many EEE producers wanted to have one access point for WEEE and battery compliance. This led the three collective WEEE organisations to discuss a compromise joint operational organisation. However, no agreement was reached.

WEEE organisations grouped under service company Elker[92] set up battery organisation Recser (approved shortly before the registration deadline on 25 September 2008). Serty, another WEEE organisation, withdrew its application to run a battery organisation and in October 2008 joined Recser as a shareholder.

WEEE organisation ERP Finland (formerly NERA), received approval as a battery organisation in June 2009, after ERP had agreed that Recser would remain operationally responsible for the take-back of all batteries collected by retailers. ERP's battery organisation thus mainly manages waste batteries built into WEEE that are collected at ERP's WEEE collection points.

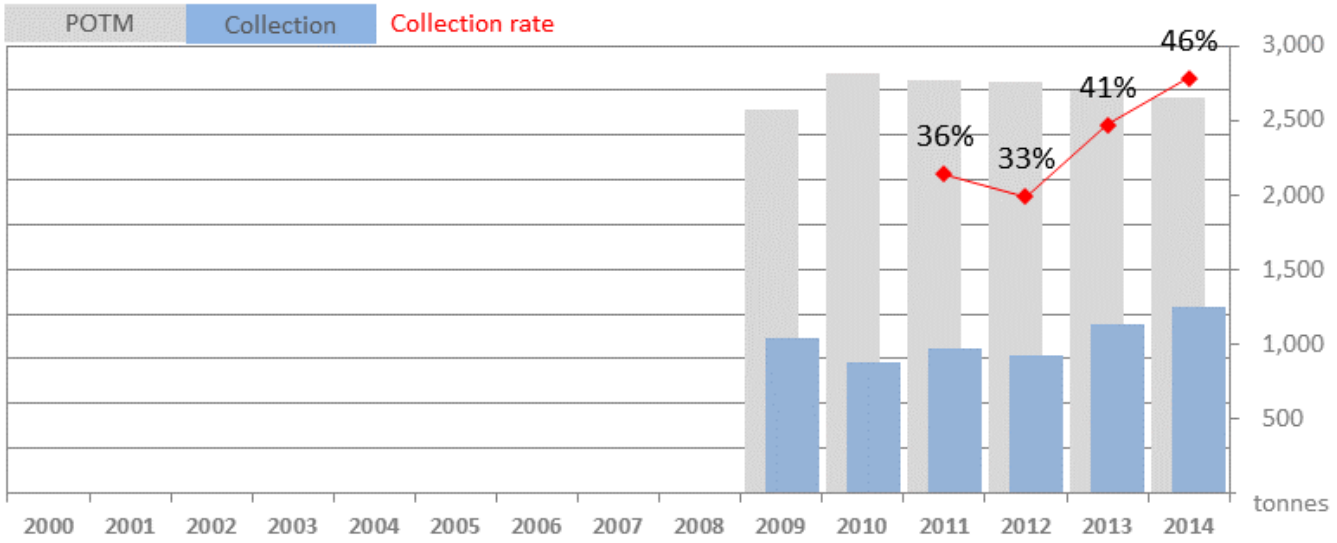
Interface with WEEE organisations

All approved battery organisations are linked to WEEE organisations which ensures good quality POM data to calculate the market share, according to which Recser's costs of battery collection and information measures are shared.

[92] Elker Oy is a service company for WEEE organisations SELT Association, ICT –Producer Co-Operative and Flip Association

Collection results

The collection volume increased by 18% in 2013 and 10% in 2014, while POM decreased by -2% in both years. The A collection rate moved from 33% in 2012 up to 46% in 2014. Before producer responsibility legislation the collection rate had been approximately 15%.



Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 12,000 waste portable battery collection points for private end-users in Finland, or one for about every 460 residents.

Kierratys, a nationwide database of collection sites maintained by Solid Waste Association JLY with input from all municipal waste facilities and producer responsibility organisations, allows consumers to find locations of collection sites and the types of wastes accepted there.

About half of waste batteries are collected through small collection boxes, the other half via large collection containers in companies, WEEE dismantlers and at some municipal collection sites.

Number of collection points and share of collected batteries 2013 (2012):

Collection point host		***Number of collection points***	***Share total waste battery collection***
Retailers	Users of Recser's collection boxes	12,000	48% (46%)
Schools			
Municipalities	Users of Recser's large collection containers	200	52% (54%)
Companies			
WEEE dismantlers			

Source: Recser

Consumer awareness

Awareness creation measures

All collection and consumer awareness measures are carried out by Recser. Costs are divided between the two organisations according to market share. Recsers' own campaigns have used print and social media. A major '**hazardous waste campaign**' in cooperation with municipal waste & water treatment companies is used on radio, TV, **youtube** and **facebook**. TV.

- **Consistent collection box design:** Recser's red battery collection boxes, supplied free of charge to over 12,000 retail outlets[93] nationwide, contribute significantly to the awareness of the waste battery collection: By early 2009 (after less than 1 year in operation) 'most' Finns were aware of the possibility of returning batteries to retailers. (By contrast, less than half knew that WEEE could be returned to retailers).

- **Small but dangerous - hazardous waste campaign (below left):** Since March 2012, the public awareness campaign titled '**Small but dangerous - Problem waste is now hazardous waste**' was carried out in cooperation with municipal waste & water treatment companies JLY, Vesilaitosyhdistys, HSY and lead-acid battery recycler Akkukierratys Pb, using all media channels including TV. It provided information on various types of hazardous wastes (including batteries) and drop-off locations.

2015:

- **Tape your batteries campaign (above right): Launched in May 2015, the campaign 'TEIPATTUNA VAARATON!' (loosely translated 'Tape to be Safe') encourages battery end-users to tape the end of their waste batteries before disposal to eliminate the risk of short-circuits. A website has been setup to provide information on the issue.**

- **Social media:** Recser maintains a **Facebook presence** as well as a **Twitter account** through which it provides information on battery recycling and organises competitions and draws. In 2011, Recser produced a video to inform consumers about safe recycling of batteries. The video recommends that consumers cover all terminals on waste

[93] Full boxes (30 kg) are picked up within 7 days of request from the retailer

batteries, in particular lithium batteries, with masking tape to prevent fire hazards before disposing of them in Recser collection boxes (viewable on **youtube**).

- **Competitions:** Recser, in collaboration with ERP Finland, conduct an annual competition entitled '**Laptop Throwing Championship**' (Läppärinheiton EM-kisat) where individuals and teams compete at who can throw obsolete laptops the furthest.

Accuracy of reporting

Pursuit of **free-riders** is mostly initiated by the organisations themselves: In spring 2011 WEEE organisations SELT, FLIP, SERTY, RECSER and Akkukierrätys informed about 2,500 potential free-riders of their WEEE and waste battery obligations. The campaign resulted in 'some' new registrations. In autumn 2011, the campaign was repeated but now supported by authorities and the results were much better, yielding over 50 new registrations.

POM and collection data are reported only by chemistry. Recser has the option for audits but has not yet carried them out. As elsewhere, the distinction between waste portable and waste industrial batteries is a challenge, especially as there is no producer organisation for industrial batteries.

Potential for improving collection rates

The retailer take-back obligation plays an important role as municipalities have no obligation or right to collect waste batteries. Explicit requirements on retailers to improve the visibility of collection boxes could help improve collection.

According to Recser, free-riding remains a problem. Stricter enforcement against free-riders would generate more funds for awareness campaigns.

FRANCE

Key points

- Since January 2001 producers have had to take back waste batteries collected by distributors, municipalities and other final holders. While large retailers initially ran individual organisations, by 2012, only two producer-controlled battery compliance organisations remained and one individually complying distributor remain.

- Since 2010, collection volumes have increased by an average of 3% annually, while POM declined by an annual average of -2%. **The collection rate of 37% in 2014, helped by a 6% decrease of POM. In 2014 Corepile's collection rate of 39.3% and Screlec's of 33.7% remained below the target of 41% set for 2014 in the Government's approval of the organisations.**

- The collection rate could potentially be increased by a higher density of collection points and additional requirements on retailers to increase the awareness of and accessibility to collection boxes.

Regulatory parameters

Overview

Decree 374 of 1999 required producers to take back batteries collected by distributors, municipalities and other final holders, through a collective or individual organisation from January 2001. Environment agency ADEME has closely monitored waste battery organisations and treatment facilities since then. **Decree 1139** of September 2009 transposed Batteries Directive 2006/66/EC. The new Decree closely aligned registration, reporting and organisation requirements with those of WEEE Decree 829/2005. **In July 2015, Directive 2013/56/EU was transposed by three legal texts. In September 2015, a Decree was published that lays down new operating requirements for battery compliance organisations applicable from 2016. Notably, it requires compliance organisation to**

- **charge fees based on eco-design criteria[94],**
- **use 'proximity' as a mandatory tender criteria and performance indicator,**
- **boost collection and conduct a study on 'batteries available for collection'.**

The Government is enabled to set a collection target above the minimum 45% for non-complying organisations.

Roles and responsibilities in waste portable battery collection

- **Producers** of PBAs to finance take-back of waste batteries collected by retailers, municipalities and economic operators (third parties who may collect batteries with the approval of the Ministry) in proportion to their market share, through an approved collective or individual organisation.

[94] **Saline battery (term used for zinc carbon, zinc manganese chemistries): + 50% on top of fee applied to alkalines if use life shorter than that of alkaline batteries.**
Non-lithium button cell: + 50% on top of fee applied to lithium cells if containing mercury and silver oxide.
NiCd: 2.5 × fee applied to NiMH
Lead battery: + 35% on top of fee applied to NiMH, as lead is a heavy metal.
Rechargeable lithium: + 20% on top of fee applied to NiMH due to danger of lithium.

- Approved **collective organisations** must take back waste batteries from distributors, municipalities and other holders nationwide and inform end-users. Conditions for **individual organisations** are identical to those for collective organisations.

- Organisations must achieve **collection targets** of 33% in 2010, increasing by 2% annually to 45% in 2016.

- **Retailers** must take back batteries free of charge and without obligation to purchase in signposted and easily accessible containers at point of sale (POS), and must inform end-users about this take-back facility.

- **Municipalities** are encouraged but not obligated to collect waste batteries.

Requirements on compliance organisations

All compliance organisations, individual or collective, must be approved by Ministerial Decree for a maximum of 6 years. A organisation must meet detailed requirements which are stipulated in its approval. The detailed requirements (approval **annex**) for the two existing collective organisations are identical. Organisations are notably required to

- achieve the **collection target** of 33% in 2010, increasing by 2% annually to 45% in 2016
- **take back nationwide** waste batteries collected by any distributor, any local authority or any other holder who so requests
- **contractually agree** with retailers and local authorities on the conditions for take-back (minimum quantities taken back, financial compensation for sorting by retailer, etc.)
- develop **consumer information** for POS with retailers and provide local authorities with consumer information tools free of charge
- **report** collection to ADEME by 1 March for the past calendar year, by region and by collection source (retail, municipal, others)
- charge producers **differentiated fees** depending on the degree of hazardousness of batteries placed on the market
- assign collection points contributing 4% of the volume they collect to a **'balancing' area** from which an under-collecting organisation may temporarily collect
- set aside 0.3% of revenues for national awareness campaigns organised by the government. The funds can be called upon at any time during the approval period.

Development of compliance organisations

Market of compliance organisations

Following the **1999 Batteries Decree**, a number of compliance organisations were approved:

- Screlec *(Société de Collecte et de Recyclage des Equipements Electriques et Electroniques)* was created in September 2001 through the amalgamation of battery recovery organisations SCRA[95] and FIBAT[96] when the major hypermarkets – who claimed their own battery brands had a market share of 30% – insisted that there should be just one organisation for battery collection.

- When Screlec planned to expand its scope to WEEE in 2003, battery manufacturers (including VARTA, Energizer and Duracell) disagreed and left Screlec to found **Corepile,** which was approved in July 2003 and began setting up a collection network in Carrefour hypermarkets and 500 municipalities.

- Major retailers (including Auchan, Boulanger, Cora, Darty, Décathlon, Fnac Surcouf, Intermarché, E Leclerc, Leroy Merlin, Match) left Corepile to set up **individual organisations**, as they saw that they were able to collect waste batteries at lower cost than the collective organisations. However, during the preparation of the 2009 Decree, retailers (re-)joined Corepile in 2008 (Castorama, Décathlon, E Leclerc and Hager) and 2010 (Intermarché).

Under the **2009 Batteries Decree** the following organisations are operating:

- collective battery organisations **Screlec** and **Corepile** were approved for the 2010-2015 period.

- an individual organisation by **Mobivia Group**, a vehicle maintenance and parts firm, was approved retroactively in 2011 for the period 2010 to 2015 (the organisation is small, collecting 1.3 tonnes in 2011). An application by specialist battery retailer **1001 piles** was not approved.

The organizations had to file a new application for approval in September 2015 for the period 2016 -2021.

Market shares and clearing for over- and under-collection

Batteries Decree 1139/2009 stipulates that the obligation to finance waste batteries is fulfilled pro-rata to new batteries placed on the market. This has been a challenge, as the two collective organisations achieve different collection rates due to the nature of their membership. While both organisations are active throughout the national territory[97], Corepile – supported by all major retail chains[98] and therefore able to access batteries collected in stores – continues to achieve a higher rate than Screlec, which is mainly supported by EEE manufacturers[99].

In 2008 and 2009 therefore, Corepile ceded 200 and 130 tonnes respectively of waste batteries to Screlec (or about 2% and 1.3% of total waste batteries collected in France). Since 2010, each organisation has had to assign collection points contributing 4% of the volume of waste batteries collected to a 'balancing' area from which the other organisation may temporarily collect in case of imbalances. **Despite the balancing, Corepile has consistently over collected. In 2014 Corepile's**

95 Set up by producers of rechargeable batteries in 1999

96 Set up by battery manufacturers and retailers

97 Coverage of the French overseas 'départements' (DOMs) is assigned to organisations by ADEME: Since 2010 Screlec has been made responsible for Guyana and Martinique, and Corepile for Reunion, Guadeloupe and Mayotte. Before that, Corepile had been active since 2007 and there were a number of local organisations.

98 Corepile members (aside from battery producers Energizer, Gillette, Duracell and Varta) are Carrefour, Wurth, Norma, Auchan, Castorama, Decathlon, E.Leclerc, Conforama, Intermarché, La Redoute

99 Screlec members include BSH, Electrolux, Epson, Fujitsu, Panasonic, Philips, Sony, Toshiba, LG, Samsung, Apple

collection rate of 39.3% and Screlec's of 33.7% remained below the target of 41% set for 2014 in the Government's approval of the organisations.

POM share	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
COREPILE	58%	57%	59%	59%	66%	67%	65%	**66%**	**67%**	**68%**
Screlec	12%	15%	19%	24%	25%	30%	35%	**33%**	**33%**	**32%**
RETAILER orgs	29%	27%	22%	17%	9%	4%				
Share Collection	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
COREPILE					68%	66%	**71%**	**70%**	**73%**	**70%**
Screlec					24%	27%	**30%**	**30%**	**27%**	**30%**
RETAILER orgs					9%	7%				
Collection rate*	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
COREPILE								**36.7%**	**38.2%**	**39.3%**
Screlec								**31.1%**	**27.2%**	**33.7%**

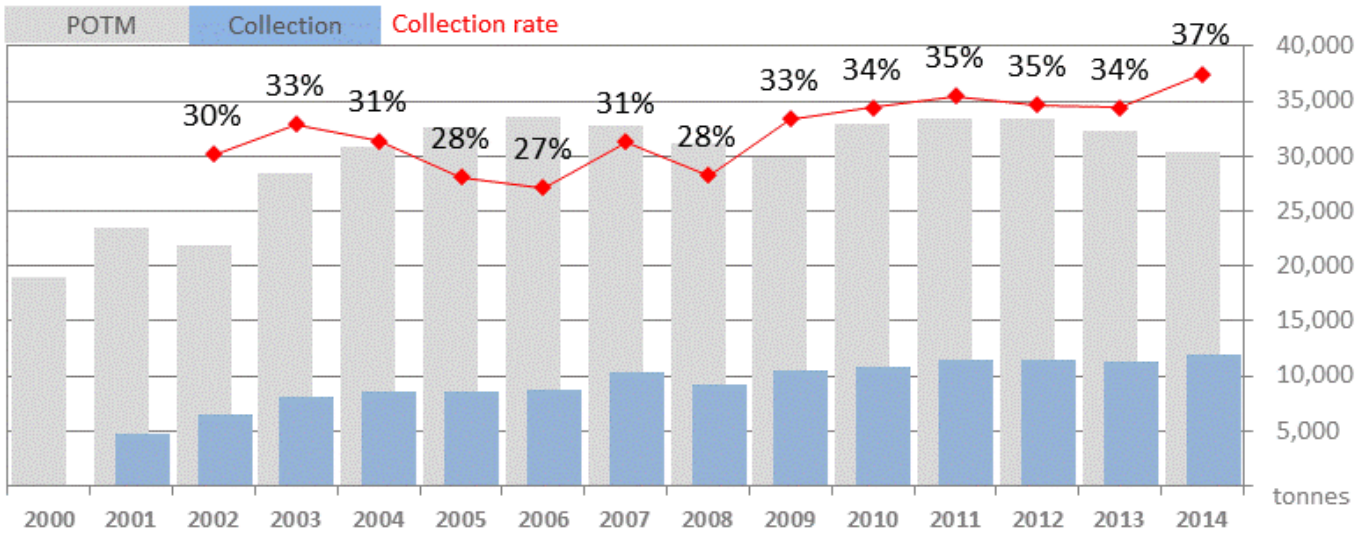
*Source: Ademe * Collection / 3 year average POM*

Interface with WEEE organisations

Producers of EEE with integrated batteries must report batteries POM directly to the battery organisations. As the battery collection infrastructure had been in place before the WEEE organisations began operations in late 2007, and Screlec and Corepile agreed to take-back waste batteries removed from the WEEE organisations, the WEEE organisations did not apply for approval as battery organisations and Procter and Gamble (Duracell) remained a member of Corepile.

Collection results

The collection rate has remained at 34%-35% since 2009 **and 37% in 2014, helped by a 6% decrease of POM.** Collection increased steadily from around 123 g per capita in 2005 to 178 g in 2011 (2013: 173 g).



Source: ADEME.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

In 2011 the organisations collected batteries from around 45,000 collection points (2012: over 50,000). While the number of collection points had more than doubled since 2005[100], their density remained comparatively low at one collection point per 1,400 residents. The recent increases in the number of collection points show diminishing returns per collection point: In 2005 an average 400 kg were collected per collection point, in 2011, 230 kg.

In 2011, 41% of waste batteries derived from collection at retailers. The share of waste batteries from municipal collection sites has declined to 30% (2010: 34%) as the organisations increase collection points at retailers.

Number of collection points and share of collected batteries, estimate 2014:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers	36,769	**41%** (2010: 34%)
Municipalities	4,784	**29%** (2010: 34%)
Schools	[1,500]	Included in above
'Others' incl. Companies	[2,300]	**23%**
WEEE dismantlers		**7%**

Source: ADEME , unless market [estimate]

Note the number of collection points provided by various actors do not line up

Consumer awareness creation

Through the project FIR P&A, Corepile and Screlec created an identity for the waste battery chain in 2011 that allows the two organisations to conduct some awareness creation measures jointly: The FiR P&A website allows consumers to find the nearest battery collection point (of either organisation) by inputting their postcode. In 2010, Corepile and Screlec prepared an educational video on the collection and treatment of batteries. **In 2014, the originations together with producers released a 'user guide for batteries and accumulators' with explanations on how to choose and prolong the life of batteries.**

The two organisations spend about EUR 0.02 per inhabitant annually on awareness creation (or EUR 100 per tonne of waste batteries collected).

[100] From 21,200 in 2005 to 45,400 in 2010.

Corepile

- **Collection boxes**: For smaller collection point hosts, Corepile distributes various small collection boxes including an efficiently designed box where the stand remains while the plastic collection container is replaced. Hosts are encouraged to return full boxes to larger collection sites at municipal sites or hypermarkets. If a small collection point host collects over 90 kg per year or has over 4 returns, larger containers are supplied (center).

  New boxes and promotional material launched in 2014 (municipal collection boxes centre):


- **Collection boxes for households:** By the end of 2007, Corepile had distributed 14 million small collection boxes to more than half of all French households. Also in 2007, Screlec began distributing small boxes to households under its mini-batribox programme. By 2010, 0.5 million had been distributed.

- **TV, radio, print and public relations:** Corepile activities have been widely featured on mass media (**list**).

- **Internet and social media:** Corepile's **main website** provides family and children's sections where information is provided in an easy to understand fashion and web-based games can be played. Additionally, a separate website, '**FaceDePile**' **(no longer operational)**, launched in 2008, contained videos, information and more.

Corepile also maintains Facebook and Twitter pages in order to reach a wider audience.

In 2014 Corepile launched the website 'je recycle mes piles' (I recycle my batteries), dedicated to providing practical information on i.e. the types of batteries collected, the location of collection points as well as learning material for teachers and children.

- **Events:** Corepile partners with various event organisers. In 2007, Corepile put graphic advertisements on a bus and parked it in various locations for public awareness and collection events. **In October 2014 Corepile setup advertising and collection boxes at the Wheelz festival – a 2 day a event dedicated to extreme sports on wheels. In late 2014 Corepile, together with other compliance organisations, sponsored an exhibition in Paris displaying works of photographer Alain Fouray focusing on the theme of recycling (below right).**

Screlec

- **Collection boxes:** Screlec distributes a suite of collection boxes: Large stores are supplied with boxes holding 15-20 kg of batteries; smaller outlets, especially pharmacists and tobacconists, with 2-5 kg boxes, and containers holding 20-90 kg distributed to large chains. Local authority collection centres (déchetteries) have been equipped with 90 kg containers.




- **Batribox campaign:** 'Batribox' is a public awareness campaign targeting children and families. Its launch was accompanied with a **website** to provide informative videos, online web-based games and quizzes, surveys and to help families and children easily navigate Screlec's website. The campaign provides schools with 'Batribox School packs', which contain a collection box, flyers, posters, DVDs etc.

- **'I Love Recycling' campaign: Screlec launched the campaign in mid-2014 with professional handball player Jackson Richardson recruited as its brand ambassador.**

Consumer awareness and disposal behaviour

According to ADEME studies in 2009 and 2010, 81% of the population claim to dispose of waste batteries separately. A 2011 study[101] on behalf of Screlec found that

- 87% of respondents claimed to dispose of batteries correctly (59% at retailers, 17% at municipal sites, 7% at work, 3% at town halls and 1% at schools).
- 6% stored spent batteries at home and did not dispose of them.
- 7% admitted to disposing of spent batteries in the household waste bin.

Moreover, 66% of respondents were aware that retailers of batteries must collect spent batteries but 61% believed that retail collection points were not properly advertised outside the shop and that consumers must look inside, 48% believed collection boxes were always too full, 30% believed collection boxes were poorly maintained. 85% of respondents believed collection points within supermarkets to be the most practical.

The 2014 study 'Portable Batteries: Disposal and Bevaviour' by Corepile, Screlec and individual complier Mobiva found that

- **79% of respondents declared to drop off batteries at collection irregularly. Batteries in EEE are often overlooked. 14% say they dispose of batteries in the regular waste bin.**
- **31% bring batteries to a collection point 'because it is a normal gesture', 49% to 'not pollute' (the environment).**
- **75 batteries are stored in the average French home (85 in a house, 63 in an apartment), of which 63 in EEE (It is noted that this number may be too low in comparison to Belgium's 114 and Germany's 115.)**
- **Collection at the workplace does not seem to be a priority for governments or businesses, with 50% responding that they do not generate battery waste (despite the use of phones and PCs on their premises) and only about 1/3 offering a collection (but 40% of hospitals).**

Accuracy of reporting

ADEME oversees the actors in the batteries and waste batteries 'chain'. Since 2001, it has published detailed annual reports about the companies involved and POM, collection and treatment volumes of all battery types. ADEME operates the **register of battery producers** which is tightly integrated with the WEEE register and is the successor to ADEME's Batteries Observatory.

POM

Audits: Organisations must ensure that at least 15% of the annual POM volume they declare derives from audited producers. Large producers are typically audited to limit costs.

Battery type identification: Producers must report POM by chemistry. The error rate is estimated to be high as staff making the declaration often do not know the chemistry nor can they distinguish the different battery types. For example, the number of industrial batteries POM fell from 16.4 million to 8 million in 2009 mainly due to a large producer having declared portable batteries as industrial batteries in 2009.

101 Les Français et le déstockage des piles et batteries usages - Résultats d'ensemble, Mars 2011

Free-riders: There has been little enforcement by authorities and latecomers were not required to retroactively report or finance waste batteries. However, despite the volumes not captured from free-riders, the compliance rate is estimated to be quite high as

- registration as a battery producer was facilitated by the fact that ADEME made adding battery registration and reporting very user friendly on a **single register site for WEEE and batteries**. Thus the number of registered portable battery producers has almost tripled since 2007. Many producers of EEE with integrated batteries had 'escaped' batteries compliance until they were required to register as EEE producers.
- sector associations are key stakeholders in the WEEE organisations and provide **industry self-enforcement** in their sector.
- as over 95% of batteries are usually put on the market by only 30% of producers, any additional registrations are likely to have only a marginal effect on POM and collection rates.

Collection

Lead batteries: ADEME's 2011 report shows zero collection of portable lead batteries, despite lead acid batteries contributing 2% to portable battery POM volumes. **Lead's share of collection has since increased to 6%[103]:**

LEAD portable	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
% of total POM	2%	2%	2%	**3%**	**3%**	**3%**
% of treatment	0%	0%	0%	**1%**	**2%**	**6%**

Unaccounted waste batteries disposed of in WEEE: Batteries integrated into EEE account for around 20%-30% of batteries POM by weight. However, in the past few years the collection rate for integrated batteries has been around only 10%[102], far below that for all batteries (34% in 2010) and the return rate of WEEE (33% in 2010). The low rate is probably caused by incorrect or missing reporting from WEEE dismantlers. **In 2013 and 2014, waste batteries received from WEEE dismantlers contributed 6.3% and 6.9% to the total collection volume of portable batteries[103].**

Potential for improving collection rates

Collection could potentially be increased by

- a higher number of collection points: Compared to collection point densities of one per 500 residents elsewhere, the collection point density in France remains low (one per 1,400 residents).

- additional requirements on or incentives for collection point hosts to increase the 'quality' (in terms of generating awareness) and accessibility of collection boxes, such as advertising the take-back option outside the shop and ensuring that collection boxes are kept in a location easily visible to consumers.

[102] Screlec received only 611 tonnes of waste batteries from WEEE dismantlers in 2010, corresponding to a collection rate of only about 8%, while the collection rate for WEEE was 30%. Corepile did not publish the amount of batteries received from EEE dismantlers.

[103] Data from ADEME batteries report 2014

GERMANY

Key points

- From 1988 industry operated a voluntary organisation collecting only 'environmentally hazardous' batteries. In response to the 1998 Batteries Ordinance, producer organisation GRS was established, and its special role as the 'joint' organisation was confirmed under the 2009 Batteries Act. In addition, three other portable battery organisations are operating.

- **Since 2010, collection increased by an annual average of 3%, POM of 1%.** The collection rate increased gradually from 37% in 2005 to **44% in 2014. The binding interim collection rate target of 40% in 2014 was met by GRS (45%), CCR Rebat (40%) and ERP (41%).**

- Improved monitoring of WEEE flows may increase the return rate of integrated batteries.

Regulatory parameters

Overview

Following a 1997 European Court of Justice ruling that Germany was in breach of its EU Treaty obligations, a **Batteries Ordinance** was finally adopted in April 1998 and came into force on 1 October 1998. The Ordinance's scope went further than Batteries Directive 91/157/EC in that most of its requirements applied to all batteries: slightly different obligations were applied to Batteries inside the scope of the Directive ('batteries containing hazardous substances') and those outside of its scope ('other batteries'). Key requirements were:

- **End-users** must dispose of ALL batteries separately from household waste.

- **Producers and distributors** may place batteries on the market only if arrangements are made for consumers to return them. They must take back spent batteries from distributors and from local authority collections free of charge.

- **Collective organisation:** The Ordinance expected manufacturers to set up a 'joint return organisation' to take back all types of battery. The organisation was to be financed on the basis of a producer's market share in the past year only.

- **Individual organisation:** However, producers had the option of notifying the Länder that they intended to remain outside the 'joint return organisation'. In this case they had to take back only the types and brands of batteries which they sold but had to achieve the same collection rate as the 'joint return organisation' within two years.

- **Distributors** had to take back waste batteries and return them to a producers' return organisation. Retailers had to take back spent batteries free of charge from end-users in-store or close to the point of sale (e.g. containers on their car park). The take-back obligation was limited to the types of batteries sold by the retailer. To protect small specialist retailers such as jewellers or mobile phone stores, the quantity which must be accepted was limited to an amount final end-users typically dispose of.

- **Local authorities** were similarly obliged to accept, free of charge, waste batteries from consumers or operators of small businesses in stationary or mobile hazardous household waste collection facilities and to make them available free of charge to producers' return organisations.

A July 2007 working document of a Batteries Ordinance to transpose Batteries Directive 2006/66/EC followed the existing Batteries Ordinance closely whilst *inter alia* adding requirements for a central register to be set up and operated by producers. Industry rejected this responsibility arguing that such a register - based on an ordinance rather than an act (the WEEE register is based on an Act) - lacked governmental powers. Eventually, the draft ordinance was converted into an act and the responsibility for the register and enforcement assigned to federal environment agency UBA.

The **German Batteries Act (Batteriegesetz) of June 2009** closely transposes Directive 2006/66/EC while maintaining existing take-back structures by continuing to mandate a single 'joint' organisation while leaving the option for individual organisations in place. **An amendment** in February 2012 introduced a binding interim collection target of 40% for 2014.

Roles and responsibilities in waste portable battery collection

- **Producers** 'fulfil their obligation by setting up and participating in the 'joint' organisation. Producers that do not participate in this organisation must set up individual organisations. Producers register with UBA to 'indicate their market participation' while volumes are reported to the organisations.

- The **'joint organisation' (GRS)** must provide collection containers to retailers and take back WPBA from them and from municipal collection points.

- Approved **individual organisations** must offer to take back waste portable batteries free of charge from all distributors and municipal collection points *[to limit the attractiveness of 'cherry picking' collection points].*

- Each organisation must reach **collection targets** of 35% in calendar years 2012 and 2013, and 40% in 2014 and 2015.

- **Retailers** must take back batteries (except those built into EEE) free of charge even if no new battery is purchased. Retailers must hand over waste portable batteries to the joint organisation (GRS). However, they may hand the collected waste portable batteries to individual organisations provided they do this for a period of at least one year and after giving three months' notice to GRS. **Distance sellers** must take back batteries at the distribution centre warehouse. They can inform customers about the take-back option with the consignment of goods.

- **WEEEE dismantlers** must make waste batteries removed from WEEE available to the joint organisation.

- **Municipalities** may, but no longer must, collect batteries separately from consumers and small businesses. They must hand them over to the joint organisation (GRS). However, they may hand the collected batteries to individual organisations provided they do this for a period of at least one year and after giving three months' notice to GRS.

Requirements on compliance organisations

The **collective ('joint') Organisation** must

- be not-for-profit
- be open to all manufacturers on the same terms
- provide, free of charge, containers to municipal collection points and retailers
- put out contracts to competitive tender for a maximum of 5 years
- disclose detailed costs[104] to authorities
- be financed by producers according to market share (by weight and battery type) in past two years (except for 2008, where only the year 2008 counts).
- report by 30 April for past year to Länder authorities and to UBA on the weight of batteries put on the market, collected and treated, prices paid for collection and take-back, by organisation and battery type and publish the information – except about finances – on its website and keep documentation for 5 years.

The collective organisation may invoice free-riders for waste batteries it collects from them.

[104] 'Costs of collection, sorting, recycling and disposal of collected waste portable batteries, including overheads, subdivided by chemical organisation and classification'

An '**individual' organisation**

- must be approved by UBA or the environment agency of a Land (region) designated by UBA. If an application is not acknowledged within 3 months, the organisation is considered to be approved[105].
- may be set up by one or several producers
- must offer to take back waste portable batteries free of charge from all distributors and municipal collection points
- may only be approved if it meets the collection targets[106].
- is subject to the same reporting requirements as the 'joint' organisation but does not have to disclose cost of collection, sorting and treatment (as the joint organisation does).

Development of compliance organisations

In response to the 1998 Batteries Ordinance, the battery industry[107] had established 'joint' or collective organisation GRS in June 1998. The GRS organisation was an upgrade of a previous organisation, operating since 1988, which collected only 'environmentally hazardous' batteries.

In addition, about 10 individual or joint organisations had been approved by the Länder in which the producer was established, the largest being VfW Rebat. Others were operated by Bosch Power Tools (which had been joined by 15 producers representing over 20 brands and 8,000 specialised dealers), watch retailers and producers of promotional gifts.

The smaller individual organisations found it increasingly difficult to match the collection rate achieved by the joint organisation.

Following the 2009 Batteries Act and its collection target of 35% applicable to each organisation, about 2,800 registered producers comply through 4 organisations:

- Stiftung Gemeinsames Rücknahmeorganisation Batterien (**GRS** - Foundation for the Joint Return Organisation for Batteries) was officially designated as the 'joint producer organisation' by the Ministry for Economy and Technology in December 2009. It represents over 90% of registered producers.

- **CCR Rebat** (formerly VfW Rebat), set up in 1998 by waste management service provider VfW (Vereinigung fur Wertstoffrecycling AG) and approved under the Batteries' Act 2009 by the Bavarian environment agency. It is held by **Reverse Logistics Group** who acquired waste service company Vfw and reverse logistics, data and clearing services specialist CCR in 2007. The group offers battery, packaging and WEEE logistics and compliance in several member states and represents about 9% of registered battery producers in Germany.

- **ERP Germany**, the national entity of the European Recycling Platform, was approved as a battery organisation in February 2010 by the environment agency in North Rhine Westphalia. Its 13 battery producer customers (2010) include Procter & Gamble (Duracell).

- **ÖcoReCell,** founded by engineering office 'IFA-Ingenieurgesellschaft für Abfallwirtschaft und Umweltlogistik mbH' whose 19 customers include Sony Computer Entertainment Deutschland GmbH and BOSCH+SOHN GmbH u. Co. KG

105 Producer-specific collection schemes may also be approved retroactively subject to the conditions necessary to ensure ongoing compliance with the recycling requirements

106 The draft of the Act had left the provision of the previous Battery Ordinance in place that required individual organisations to achieve at least the same collection rates as the joint organisation

107 The founders included Duracell, Panasonic, Philips, Ralston Energy Organisations, Saft-Nife, Sanyo Energy, Sony, Varta and ZVEI (the electrical and electronics manufacturers association). Recyclers have not been included in the Foundation to ensure competition among recyclers.

Market shares and clearing for over- and under-collection

Organisations must reach the collection targets. There is no mechanism to adjust for over- and under-collection, or to define what actions would be taken if collection targets are not achieved. The 'individual' organisations (ERP and CCR Rebat) continue to achieve lower collection rates than GRS.

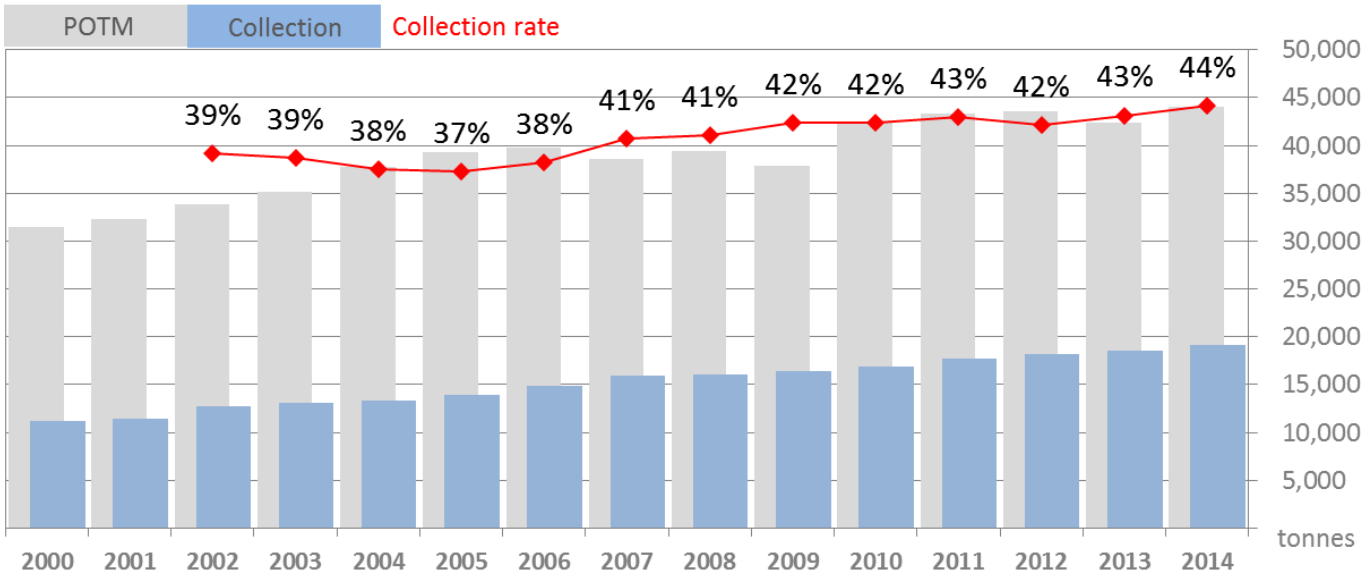
Share of POM volumes	***2000***	***2005***	***2010***	***2011***	***2012***	***2013***	***2014***
GRS	93%	88%	80%	76%	76%	76%	**78%**
CCR Rebat	7%	12%	15%	20%	20%	20%	**18%**
ERP			5%	4.1%	3.6%	3.3%	**3.8%**
Örecell			0.04%	0.3%	0.4%	0.4%	**0.4%**
Share of collected volumes	***2000***	***2005***	***2010***	***2011***	***2012***	***2013***	***2014***
GRS	83%	88%	86%	83%	80%	80%	**78%**
CCR Rebat	17%	12%	12%	14%	16%	17%	**18%**
ERP			1.8%	2.6%	4.0%	3.1%	**3.4%**
ÖcoReCell			0.1%	0.1%	0.3%	0.3%	**0.3%**

Interface with WEEE organisations

The German WEEE Act does not recognise WEEE organisations and hence there is no interface with the Battery organisations. However, WEEE dismantlers are legally required to make waste batteries removed from WEEE available to the joint organisation.

Collection results

The collection rate increased gradually from 37% in 2005 to 42% in 2010 **and 44% in 2014**. All organisations report having achieved the 2012 collection target of 25%. **The binding interim collection target of 40% in 2014 was also reached by GRS (45%), CCR Rebatt (40%) and ERP (41%) which could increase its collection of non-lead portable batteries by 18%.**



Source: Organisations' reports

Drivers affecting the collection rate

Availability of collection points and use of collection channels

GRS services about 170,000 GRS waste portable battery collection points in Germany, or about one per 480 residents.

Almost half of all waste batteries are collected at retailers, close to 30% are taken back from companies and private sector collectors and around a quarter are collected at municipal collection points (¾ in fixed containers, the rest through mobile collections). The shares of collection sources have not significantly changed in recent years.

Safety of collection: In view of the fast growing use of Lithium batteries and the safety risks involved in their storage (fire hazard), German battery organisation GRS is in the process of changing its collection infrastructure to include separate collection points for 'high-energy batteries'. Starting in 2013, GRS has set up new 'qualified return points' for high-energy batteries[108], including lithium batteries used in ITC equipment, power tools, and in more recent applications such as security technology, power generation and transportation organisations. The new collection points will be operated by municipal authorities, specialist retailers and trade outlets and require significant investment by GRS that will 'inevitably' have an effect on compliance costs for lithium batteries. For end-users nothing should change (they can still return their batteries as usual). The change follows a major research project that GRS carried out with Bifa Environmental Institute.

CCR Rebat collects waste batteries at around 5,500 collection points from 20,000 business end-users. **ERP's** 2012 report to UBA notes that collection infrastructure could be expanded especially at public collection points.

Number of collection points and share of collected batteries, 2012, GRS only:

Collection point host	***Number of collection points***	***Share total waste battery collection***
Retailers serviced by organisations	140,000	48%
Municipalities	1,000	23%
Schools		
Companies	30,000	29%
WEEE dismantlers		Included in above

Source: GRS

Awareness creation measures

Supporting legal requirements

Producers, or their collective organisation (GRS) must inform consumers about potential hazards to health and the environment, etc. If campaigns are conducted that do not lead to distortion of competition, **individual organisations may be required** to participate in the financing according to their market share.

Distributors must inform customers, near the take-back point, (which must be in the main sales area) about the possibility to return WPBAs free of charge. Distance sellers must provide this information in their respective sales media and include it with the shipped goods.

[108] GRS groups waste batteries into three safety categories: Conventional, high-energy and damaged high-energy waste portable batteries.

GRS

GRS has aimed to continuously raise collection rates with consumer-oriented PR activities stressing the need for separate collection of batteries and drawing attention to the collection facilities available. The measures have changed over the years, depending on the target groups.

- Over 675,000 of GRS' **green collection boxes** (5 kg and 10 kg, plastic and cardboard) are regularly distributed to over 140,000 trade outlets. In addition, 70,000 60 or 120 litre plastic collection drums are sent to over 1,000 municipal collection points and 30,000 business / private sector collectors. Distribution of boxes and drums is free of charge. Pick-up is administered by a call centre. **Following pilots in June 2014, GRS introduced its new safety concept in May 2015 in line with new dangerous goods requirements: Batteries are differentiated according to three safety classes: 1) Conventional batteries (green containers, left tray for large batteries), 2) high-energy batteries (yellow boxes and barrels) and 3) Damaged high-energy batteries (red).**

- The 2012/13 **educational initiative** Inspector Energy (Facebook page) under the motto 'Batterien – da steckt mehr drin' (There is more in batteries) is designed for 5-7 year old children. Kindergartens or other institutions can book performances in which basic concepts of electricity are explained in a playful, experimental manner and include a puppet theatre. The performances are conducted by teaching and scientific staff of i!bk (Institute for innovative education). Almost 100 Inspector Energy performances took place in 2012 and over 40 in the first half of 2013, mainly in rural areas with below average collection rates. The initiative also includes a school competition around the topics of energy and electric mobility which touches on bicycle batteries.


- From 2003 the BATT-X-PRESS information tour bus visited between 50 and 200 cities annually.

- Past measures included TV ads and radio campaigns. In 2009, GRS estimates that its campaigns made 282 million contacts (3.5 contacts per inhabitant).

- Videos from or about GRS (**links**)

CCR Rebat

- Rebat services mainly large end-users. Collection boxes for smaller collection point hosts follow the design used by Rebat in other countries.

ERP

- **Collection box** and large volume drum: ERP's 2012 report to UBA notes that collection in December 2012 increased by 56% over December 2011 and that collection infrastructure could be expanded, especially at public collection points.

Consumer awareness and disposal behaviour

No studies have been publicly released.

Accuracy of reporting

Organisations must annually report to the environment agencies, POM and collection volumes broken down into detailed chemistries, primary and secondary batteries and battery types. Notably, this information must also be published on their website, which provides a basis for self-control and trust between the organisations.

Environment agencies may require these reports to be audited by an independent party. There have been no enforcement measures by authorities.

We estimate the effects of problematic waste battery streams that distort collection to be comparatively small:

Industrial batteries: GRS operates a separate take-back organisation for industrial batteries (mostly drive batteries from electric vehicles such as forklifts, etc.) with 3,000 collection points. In 2011, GRS set up a separate collection organisation for 'industrial' batteries from electric bicycles[109] with a weight of over 500 g in cooperation with the association of the two-wheeled vehicles industry (Zweirad-Industrie-Verband). While bicycle batteries of lead or NiMH with a weight of less than 500g may be deposited in collection containers for portable batteries, lithium bicycle batteries with a higher weight are collected in specific containers designated for industrial batteries only, as required by hazardous waste transport requirements.

Lead acid: Over all organisations, the return rate of portable lead batteries was 171% in 2013 **and 151% in 2014**[110]. However, as the share of portable lead batteries in POM is small (overall 2-3% of POM), removing lead acids from the collection rate calculation lowers the collection rate for all other battery chemistries by only 1-2%.

Potential for improving collection rates

The return rate of waste batteries from WEEE, though not clearly identifiable, is estimated to be low. Improved monitoring of WEEE flows may increase the return rate of integrated batteries.

[109] Bicycle batteries fall under the definition of 'industrial battery' in Batteries Directive 2066/66/EC: Article 3, point 6: (6) 'industrial battery … means any battery or accumulator designed for exclusively industrial or professional uses or *used in any type of electric vehicle*

[110] **As of 2014, the return rate of lead batteries reported by all battery organisations is reasonable: GRS' 83% (2013: 94%), Rebat 97% (2013: 92%), ERP 202% (2013: 3,970%).**

GREECE

Key points

- A Presidential Decree of 2004 required producers to set up battery organisations and achieve a collection rate of 30% by 2006. In response, AFIS, the only collective organisation for batteries, was established by battery importers as a non-profit company. A new Decree transposed Batteries Directive 2006/66/EC in 2010. It initiated a register of battery producers and allowed producers of batteries integrated in EEE to comply through the WEEE organisation, which meant that the weight of batteries placed on the market in EEE was no longer reported from 2011.

- The collection rate increased strongly from 2005 to 2010 and has since stayed around 35%. **In 2014, a rate of 36.8% was reached.** From 2010 – 2013, POM volumes fell by 30% due to the economic crisis.

- Measures to improve the collection rate may include tighter enforcement on free-riders to increase available funding, improved cooperation with the WEEE organisation to account for more waste batteries removed from WEEE and incentives for municipalities to contribute to collection or awareness creation measures.

Regulatory parameters

Overview

Presidential Decree 115/2004 on 'Measures, Conditions and Programme for the Alternative Management of Spent Batteries & Accumulators' aimed to establish an alternative management organisation for spent batteries as laid out in Law 2939/2001. Producers were to set up or participate in schemes for alternative management of the waste batteries related to their activities, while municipalities were obliged to set up schemes for the alternative management of waste batteries arising with municipal waste and to co-operate with the above schemes. By the end of 2006, a minimum of 30% by weight put on the market of all spent batteries was to be collected.

A new **Ministerial Order[111] of October 2010** transposing the provisions of Batteries Directive 2006/66/EC shifted the responsibility to set up collection schemes entirely to producers and required EOAN, the National Recycling Organisation, to set up a register of producers (not just approved organisations) by 10 April 2011. It included simplified requirements for producers of EEE with integrated batteries. Legislation remained unchanged in 2013 **and 2014.**

Roles and responsibilities in waste portable battery collection

- **Producers** must comply through an approved individual or collective battery management organisation. Producers of EEE with integrated batteries may comply through their approved WEEE organisation if it has an agreement with a battery organisation (producers do not currently report weight or units of batteries integrated into EEE). The Ministry may exempt small producers if this does not significantly impact on the collective organisation.

- Approved **waste battery management organisations** must be not-for-profit organisations and must organise collection.

- **Retailers** are not obligated to take back batteries **unless assigned to do so by a compliance organisation.**

- **Municipalities** are not required to collect batteries but must provide public space to the organisation for collection if required to do so.

111 Ministerial Edict 41624.2057.E103.2010

Requirements on compliance organisations

Collective organisations must be not-for-profit and are subject to approval and permission from EOAN. Approval of individual and collective organisations (to be granted the 'Certificate of Alternative Management') must be renewed every three years. Approval fees are: EUR 5,000 for individual organisations; EUR 10,000 for nationwide collective organisations; and EUR 3,000 for geographically limited collective organisations. Requirements for individual organisations are annexed to the Decree.

Approval criteria for **individual organisations** are similar to those for collective organisations.

Development of compliance organisations

AFIS, the only collective organisation for PBAs, was established by battery importers in 2004 as a non-profit, public limited[112] company. It was approved by the Ministry in 2004 to operate a nationwide collection organisation and began operations in 2005. The establishment of AFIS was preceded by a pilot project, DIASBAT, which ran from 2003 to 2005 and was led by GERMANOS S.A., an electronics retailer.

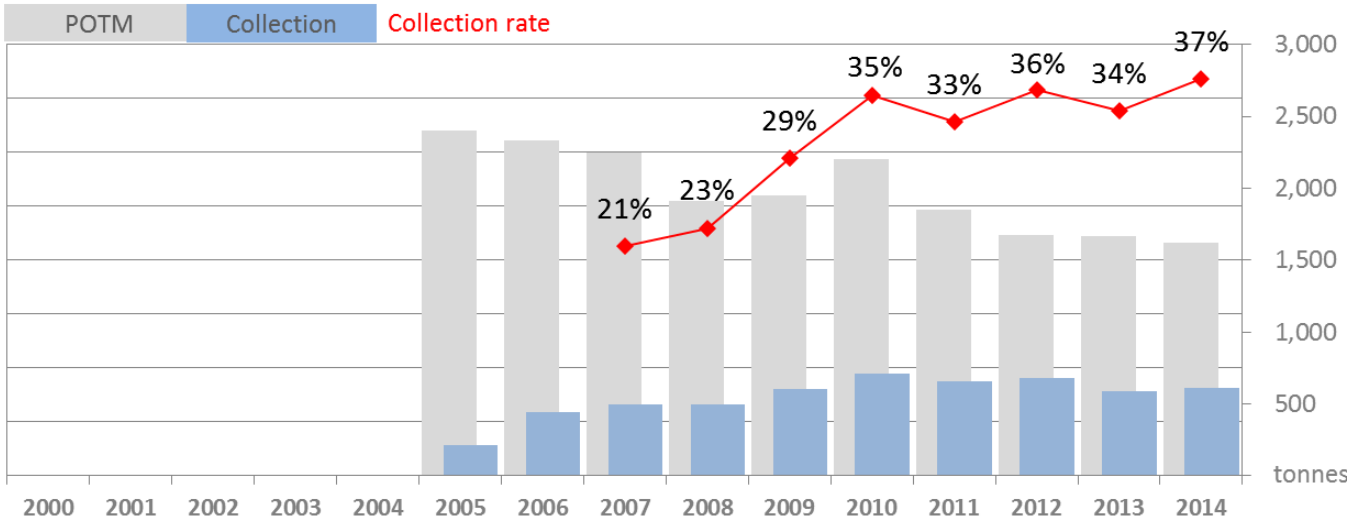
Interface with WEEE organisations

AFIS has an informal agreement with Electrocycle to take back all waste batteries from WEEE dismantlers. Neither party pays the other. By mid-2012 the number of AFIS' participants had halved to 96 (2010: 180) due to a) the simplified requirement of the 2010 Ministerial Decree that allowed importers of EEE with integrated batteries to comply through their WEEE organisation and b) the economic crisis that forced many importers to close.

Collection results

The collection rate increased strongly from 2005 to 2010 and has since stayed around 35%. In 2014, a rate of **36.8% was reached.** From 2010 – 2013, POM volumes fell by 30% due to the economic crisis, while the collection volume remained stable.

Collection on the Greek Islands contributed about 10% in 2010 to the total volume collected (the share of population on the islands is about 12%).



Source: AFIS

[112] Greek Societe Anonyme (Anonymi Etaireia)

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 60,000 waste portable battery collection points in Greece, or one per 182 residents. AFIS places collection bins at easily accessible sites including municipalities, schools, supermarkets, shops, public institutions, hospitals, military units, private companies, banks and department stores. AFIS notes that the collection volume and the number of collection points increased from 2006 to late 2010 but have slowed down since 2011 due to the general economic conditions and closure of shops.

Almost half of collected waste batteries derive from collection points at retailers, one third directly from companies. Collection points at municipal sites and schools contribute 9% and 8% respectively.

Number of collection points and share of collected batteries in 2012:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	20,700	**48.5%**
Municipalities	9,600	9%
Schools	13,800	8%
Companies	14,400	33%
WEEE dismantlers		1.5%

Source: AFIS

Consumer awareness creation

AFIS has run various campaigns since 2005. The '**Recycle your batteries – let the earth breathe**' (2005-2008) and '**Recycling is life**' (2009/11) campaigns employed TV, print and radio media (TV commercials 1 & 2) and targeted all age groups.

AFIS' 2012 campaign '**Recycle with just one move**' aimed to achieve an 80% recognition rate of the AFIS programme and to prompt end-users to dispose of lithium batteries which are often stored at home. The primary target group was children aged 6-18, the secondary target group parents interested in environmental issues. Due to AFIS' falling fee revenue in the economic crisis, the 2012 campaign did not use TV but focused on social media to promote online games, events and raffles. AFIS notes that in the course of the campaign many regional TV and radio stations asked for promotional messages and aired them free-of-charge. The campaign reached almost 1.9 million unique users and received 8,500 Facebook 'likes'. Total costs were about EUR 0.02 per capita.

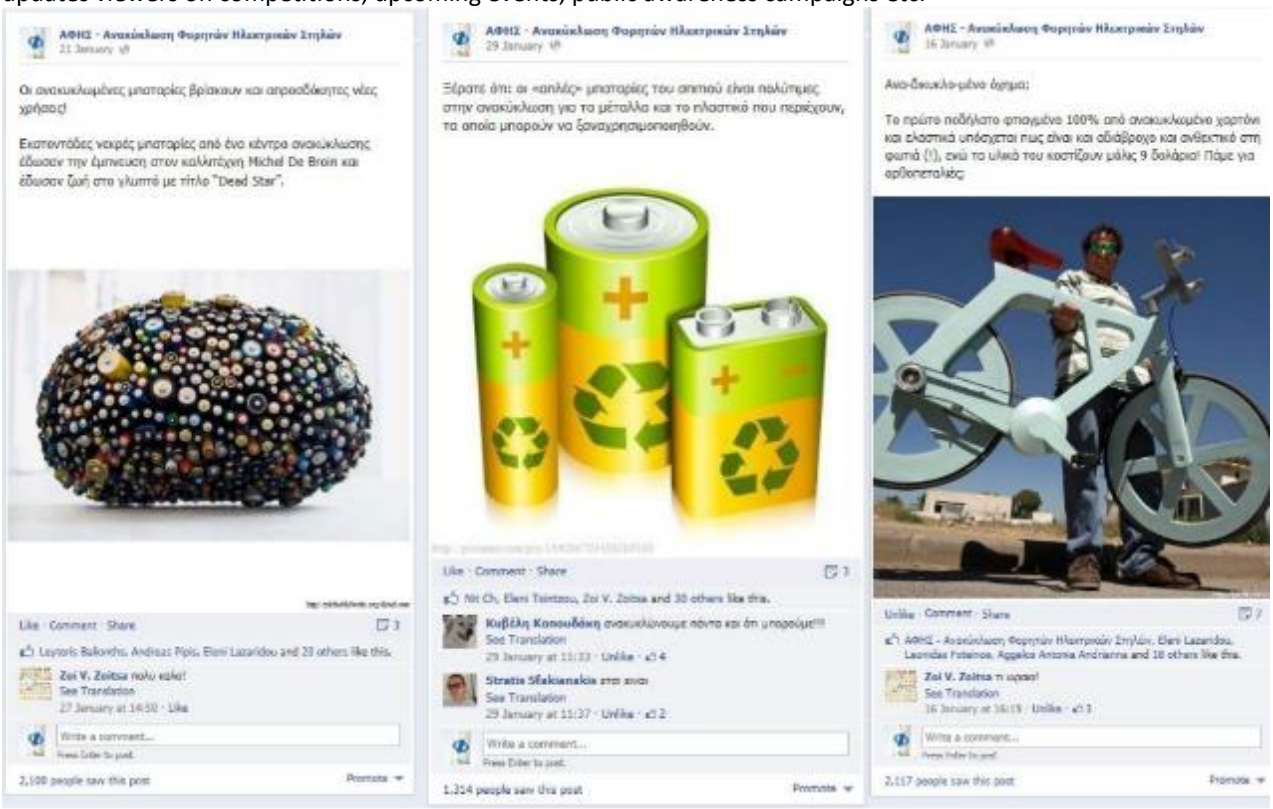
- **Collection boxes:** AFIS uses tall eye-level containers to attract attention. The containers, bearing the AFIS, logo, telephone and fax numbers, and the message "Battery Recycling" in Greek and English, can be ordered via the AFIS website. The 60,000 collection points are serviced by 10 logistics companies who are paid per number of points visited, independently of the volumes of batteries taken back.

- **Information brochures:** To raise awareness about the programme, AFIS has so far distributed about 3.4 million leaflets to schools, shops, banks, municipalities, supermarkets etc.

- **CD-ROM for schools:** Together with collection boxes, schools receive a comprehensive information package for students on CD-ROM. There are separate packages for primary and secondary students.

- **Information Day:** Information workshops are held in municipalities, schools and other organisations to inform about and promote battery recycling.

- **Social/internet media:** AFIS operates a Facebook page where it provides collection and recycling information and updates viewers on competitions, upcoming events, public awareness campaigns etc.



Source: AFIS 2012 Progress report

Accuracy of reporting

AFIS POM reporting is broken down into primary and secondary batteries but not by chemistry. As most waste batteries are sorted by recyclers outside Greece, collection reports are not broken down into chemistries either.

Battery type distinction: All batteries up to 1.5 kg are considered to be portable batteries as other battery type definitions do not allow for clear distinction. This may mean that batteries declared as industrial batteries elsewhere are accounted for in the portable batteries volume in Greece.

Batteries integrated into EEE: Under the simplified requirements of the 2010 Ministerial Order**,** producers of EEE do not have to report integrated batteries (EEE producers claim that – with the exception of laptops – they do not have the means to provide details for batteries in EEE). As a result AFIS has to make an assumption about the weight of batteries in EEE and it is currently estimated that the weight of batteries incorporated in EEE is 10% of the total portable batteries market. Compared to other countries, this is rather low (Switzerland: 17%, Belgium 39%).

On the other hand, the percentage of *waste* batteries AFIS derives from WEEE dismantlers is also very low (1% - 2%), compared to other countries (5% - 15%). Reasons for the low return rate of integrated batteries are probably

- WEEE dismantlers selling waste batteries with valuable chemistries directly to battery recyclers without the intervention of AFIS.
- WEEE being shredded without battery removal.

AFIS estimates the amount of free-riders at 3%-5%. There have been no **enforcement actions** by authorities as regards POM or collection reporting.

Potential for improving collection rates

Measures to improve the collection rate may include

- tighter enforcement of free-riders to increase available funding
- improved cooperation with WEEE organisation to account for more waste batteries removed from WEEE
- incentives for municipalities to contribute to collection or awareness creation measures.

HUNGARY

Key points

- Since 2000, the **Product Fee Act** has applied to accumulators (but not single charge batteries). From 2005 collective compliance became feasible as a compliance option and three producers organisations, RE'LEM, Re-bat and CCR Rebat have been operational since then. The management of waste batteries by 'producer responsibility organisations' has been working well, leading the Government to keep the waste producer responsibility scheme for batteries as it is when it replaced the competing organisation model applied to most other waste streams with state fund model from 2012.

- The collection rate increased from 28% in 2012 **to an estimated 36% in 2014. While collection volumes increased steadily 4%-5% since 2012**, the increase in the collection rate was assisted by a 30% decline in POM in 2012, probably due to delayed effects of the 2008/9 economic crisis.

Regulatory parameters

Overview

Since 2000, the **Product Fee Act** has applied to accumulators, but not to single charge batteries, independently of whether they qualify as portable, industrial or vehicle batteries. Since 2005, the product fee has been set at around EUR 600 per tonne put on the market (a separate fee of about EUR 3,800 per tonne applied to mobile phone accumulators until January 2010). Batteries Directive 2006/66/EC was transposed through **Government Decree 181 (take-back) of July 2008** (replaced by Decree 445/2012 from 2013), covering all batteries, and Ministerial Decree 21/2008 on treatment. A collection target of 18% was set for 2008, increasing gradually to 45% in 2016.

A new Product Fee Act, published in July 2011, replaced private-sector recovery organisations for WEEE, packaging and other products with a state-owned, not-for-profit National Waste Management Agency from January 2012. The waste battery organisations (RE'LEM, Re-Bat and CCR Rebat) were among the few compliance organisations[113] not affected by the nationalisation and remain responsible for the management of waste portable batteries.

Roles and responsibilities in waste portable battery collection

- **Producers** must take back batteries and accumulators collected by distributors, municipalities and other final holders through a collective or individual organisation. They must achieve collection targets that increase annually from 18% in 2008 to 45% in 2016[114], and – since 2013 – have had to ensure at least one collection point in villages with over 100 inhabitants.

- **Collective organisations** (called co-ordination organisations) must be set up by producers and are subject to permit and other requirements. Organisations must limit their activities to batteries (which prevented WEEE organisations from acting for batteries).

- **Individual compliance** requires a permit and, for batteries but not for accumulators, a financial guarantee of HUF 1 million (~EUR 3,700) per tonne of batteries put on the market.

[113] Organisations for expired lamps, medicines and contaminated packaging material (e.g. pesticides) are also not affected by nationalisation

[114] On a side note: Independently of these targets, producers of starter batteries must collect 95% of batteries put on the market to qualify for an exemption from the product fee. As this has not been achieved, producers currently pay the full product fee.

- **Retailers** must take back batteries free of charge from 1 July 2009. Until that date take-back was only by agreement with a producer. Retailers may return batteries to wholesalers.

- **Municipalities** may collect but are not obliged to do so.

- Producers to achieve (interim) **collection targets** (in 2008 and 2009, target based on quantity put on market in current year, in 2010, based on average of current and previous year):

Year	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
Coll. Target	18%	19%	21%	23%	25%	30%	35%	40%	45%

Requirements on compliance organisations

Collective organisations ('co-ordination organisations' or, from 2013 'broker' organisations) must

- be established by producers as non-profit organisations
- have a minimum share capital of HUF 20 million (~EUR 75K) rising to HUF 30 million (~EUR 110K) by 2010
- be registered with the National Inspectorate for Environment, Nature and Water.
- limit their activities to batteries.

Individual organisations must

- have a permit from the National Inspectorate for Environment, Nature and Water
- provide a financial guarantee of HUF 1 million (~EUR 3,700) per tonne of batteries put on the market in the previous year. The guarantee can be provided through insurance, bank guarantee or blocked bank account. The guarantee is not required if the batteries are subject to the product fee (batteries for mobile phones and other accumulators) which an individually complying producer must pay but may reclaim if targets are met.

Development of compliance organisations

Three organisations covering portable batteries have been operational since 2005/6, with around 250 – 300 producer members between them:

- **RE´LEM Nonprofit Kft**, established by Energizer Hungary, Gillette Group Hungary (now Proctor and Gamble) and VARTA Hungary, received its license in August 2005. It started taking back portable batteries on 22 August 2005. It has around 180 members, including HP, Philips, Matsushita, SONY and SAMSUNG.

- **Re-bat Nonprofit Kft**, established in 2005 by ATC-TRADE Corporation, one of the largest battery importers, Re-Bat has grown to around 30 members including Ikea, Lidl, Penny, Hitachi, Metabo, Canon, TDK, Maxell

- **CCR Rebat Nonprofit Kft** (formerly Akku-Hulladek). Reverse Logistics Group CCR took over Akku Hulladek at the end of 2007. Akku Hulladek had begun to take back batteries in 2006. It has about 20 member companies, including medium-sized Hungarian companies and subsidiaries of international companies.

Organisation **Hungarohab** focuses on automotive and industrial batteries.

Market shares and clearing for over- and under-collection

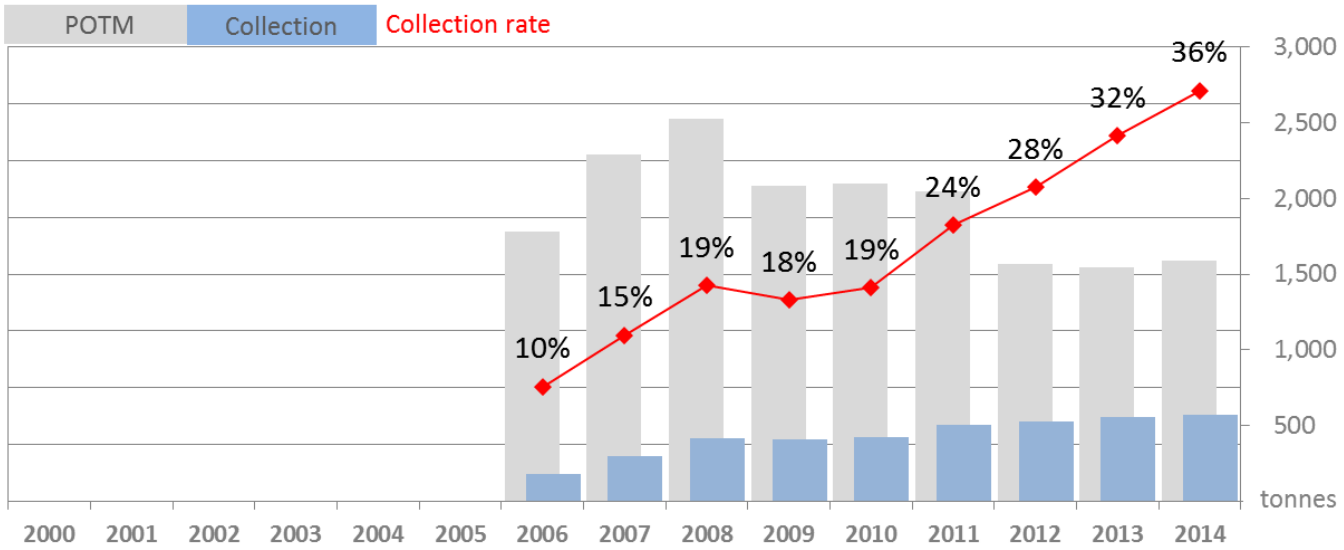
According to RE'LEM, its market share which had for years been between 65% and 70%, increased to 76% in 2012. As the organisations need to individually achieve the collection target, there is no need for clearing for over- and under-collection between them.

Interface with WEEE organisations

There has been little coordination between battery and WEEE organisations (and from 2013 with the National Waste Management Agency OHÜ). Battery organisations co-ordinate with the WEEE dismantlers directly to take over all removed batteries.

Collection results

The collection rate increased from 28% in 2012 **to 32% and 36% in 2013 and 2014 respectively. While collection volumes increased steadily 4%-5% since 2012**, the increase in the collection rate was assisted by a 30% decline in POM in 2012, probably due to delayed effects of the 2008/9 economic crisis. The national collection targets[115], from 7% in 2005, 18% in 2009 to 23% in 2011, had consistently been met or slightly exceeded. RE'LEM had already achieved a collection rate of 30% in 2012.



Source: Post 2010 RE'LEM, 2014 estimate based on RE'EM data

[115] In 2008 and 2009, target based on quantity put on market in current year, in 2010, based on average of current and previous year.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 39,000 waste portable battery collection points in Hungary, or one per 270 residents. 31,000 are serviced by RE'LEM which appears to have a presence in each community, followed by Re-bat with around 6,500. The number of municipal collection points serviced by compliance organisations has been increasing by a factor of nearly 5, due to the legal obligation for producers (introduced by the 2013 Batteries Regulation) to ensure at least one collection point in townships with more than 100 inhabitants. In consequence, the importance of school collection appears to be declining for RE'LEM and Re-bat.

Number of collection points and share of collected batteries, estimate 2013 (2012):

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers*	25,000 (no change)	35% (25%)
Municipalities*	1,900 (400)	6% (5%)
Schools	7,000 (no change)	41% (60%)
Companies**	5,000 (no change)	18% (10%)
WEEE dismantlers	10	[included in above]

* *serviced by compliance organisation directly (RE'LEM operates the collection points of the municipalities directly.)*
** *battery end-users other than small commercial and household*

Source: RE'LEM; own estimate based on partial organisation data

Consumer awareness creation

Legal requirement

Producers must fund joint or individual public information campaigns using mass media such as newspapers and TV at least twice per year. Measurable criteria are not provided.

RE'LEM

Collection boxes: Different sized collection boxes from 12 to 80 litres are available in standout colours. New boxes and pick up of full boxes can be ordered free-of-charge through RE'LEM's website. FoReGo Ltd is RELEM's exclusive partner in operating the waste batteries collection. End-users can find RE'LEM collection points here or here:

- 

- **'Pontvelem'** ('Score with me') **School contests** have been running continuously since September 2011, with over 3,000 schools taking part. The contests are organised together with Energizer and allow schools to collect points based on the volume of batteries they collect. The contests' dates, terms, prizes and updates on the contestants and results are announced on a website and Facebook.

CCR-Rebat

- **Collection boxes:** REBAT collection boxes are distributed with accompanying posters.

- **Public awareness campaigns:** In 2009, a collaboration between CCR Rebat and mobile service provider Vodafone, launched a public awareness campaign at the Budapest Zoo. Collection points were setup at multiple locations within the zoo for the collection of cell phones and batteries.

Re-bat (ATC)

- **Collection points:** End-users can identify the nearest collection point **here**.

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM and collection **reports** must be broken down into primary and secondary batteries. Secondary batteries must be further broken down into certain chemistries (alkaline, NiCd, rechargeable button cells). A report from the Ministry of Rural Development shows the following shares and return rates for 2009. The overall collection rate based on current year is 21%. Removing lead acid batteries from both POM and collection results in a rate of 19%.

2009	***Share of POM***	***Share of collection***	***Return rate***
Lead acid accumulators	1%	5%	79%
High-capacity alkaline accumulators	0%	0%	0%
Small capacity alkaline accumulators	13%	6%	9%
of which Ni-Cd	1%	3%	59%
Button cells	0%	0%	0%
Other batteries	85%	90%	21%

Enforcement: The product fee organisation ensures a high compliance rate among producers. There have been enforcement actions by authorities regarding free-riders and faulty POM reporting.

Potential for improving collection rates

The collection rate may be improved through measures in the following areas:

- **Contribution of municipalities:** Coordination between the organisations to create incentives for municipalities to collect batteries separately and engage in awareness creation could potentially raise collection at municipal collection sites which currently contribute only around 5% to waste battery collection volumes.

- **Requirement on minimum awareness spending or coordination between organisations:** Price competition between the organisations is high and the legal requirement for producers to fund two information campaigns annually is loose enough to cause organisations to limit marketing spending significantly. Waste battery collection may benefit from a tighter legal requirement or mandated coordination between the organisations with regard to awareness and collection campaigns. In addition, a shared collection point locator could improve convenience for end-users.

- **Retailers' obligations** regarding the visibility of collection boxes could be strengthened.

ICELAND

Key points

- Iceland's **1999 Regulation on Batteries** imposed eco-fees on batteries, to be charged by customs on import of batteries. This was to fund the separate collection of hazardous wastes, including waste batteries, by the government's Icelandic Recycling Fund. Legislation transposing Batteries Directive 2066/66/EC extended the scope of batteries covered and maintained the existing financing and collection mechanisms. The Fund must ensure that battery collection targets are met.

- **In 2014, the collection rate fell to 26% (from 33% in 2013) as collection decreased by -27% and POM by -11%. Due the small total volumes, POM and collection are subject to strong annual fluctuations.**

- Implementation of the retailer take-back obligation would improve the comparatively low collection point density and increase the collection rate.

Regulatory parameters for compliance organisations

As a signatory to the EEA agreement, Iceland must transpose EU waste legislation. Iceland's **1999 Regulation on Batteries** (No. 946/1999) imposed eco-fees, charged by customs on import of hazardous batteries, to fund the separate collection of hazardous wastes, including waste batteries, by the government's Icelandic Recycling Fund. Preparations to transpose Batteries Directive 2066/66/EC began in 2010 and resulted in **an amendment to the Waste Act** (No. 58/2011) and a **2011 Batteries Regulation** (No. 1020/2011). The amendments extended the scope of batteries covered and maintained the existing financing and collection mechanisms, while introducing the labelling requirements, substance prohibitions and collection targets of the EU Directive. An amendment to the Act on Waste, adopted in May 2014, i.a requires battery producers to finance the producer reporting and registration organisations, revises registration and reporting requirements and elaborates the Fund's monitoring and data collection obligations.

It should be noted that in 2008 the WEEE Directive was implemented through competing producer organisations without the involvement of the Icelandic Recycling Fund. This approach proved to be ineffective[116] and, supported by industry, the 2014 amendment on the Act on Waste shifted the responsibility for WEEE management to the Icelandic Recycling Fund.

Roles and responsibilities in waste portable battery collection

- **Producers** are required to register with the Environment Agency (Umhverfisstofnun). However the register has not yet been established, there is no deadline and reporting obligations for producers have yet to be defined. Batteries placed on the market incorporated in EEE are not currently subject to registration obligations but further regulation may change this.

- **Producers and importers** must finance the treatment and the collection of waste batteries through payments to the Icelandic Recycling Fund and must inform the public about municipal waste battery collection.

- **Retailers** must take back waste batteries free of charge.

- The **Icelandic Recycling Fund** must ensure that collection targets are met and the **Environment Agency** must maintain the register of producers (detailed reporting requirements have yet to be set).

[116] Due to disagreements between organisations about a clearing between organisations and an alleged high number of free-riders due to customs authorities not being involved in the fee charging mechanism

- **Municipalities** must collect waste batteries from residents and provide guidance on the location of the collection points.
- Licenced (at IRF) **waste service providers** must take back waste batteries from municipalities and retailers free of charge and claim expenses from the Icelandic Recycling Fund against proof of processing or disposal. Processing may be carried out abroad. There is as yet no disposal ban for waste portable batteries.

Requirements on compliance organisations

n.a.

Development of compliance organisations

The Fund is fed by a fee on all batteries, charged by the Customs Authority on import. The Fund's fees are set to cover the actual cost of current waste battery management and not to build reserves: in 2011 fees were about EUR 300 per tonne of batteries placed on the market, while the Fund paid out to four waste management companies an average of EUR 1,200 per tonne of batteries collected (the collection/POM ratio has been around 25%).

Clearing for over- and under-collection

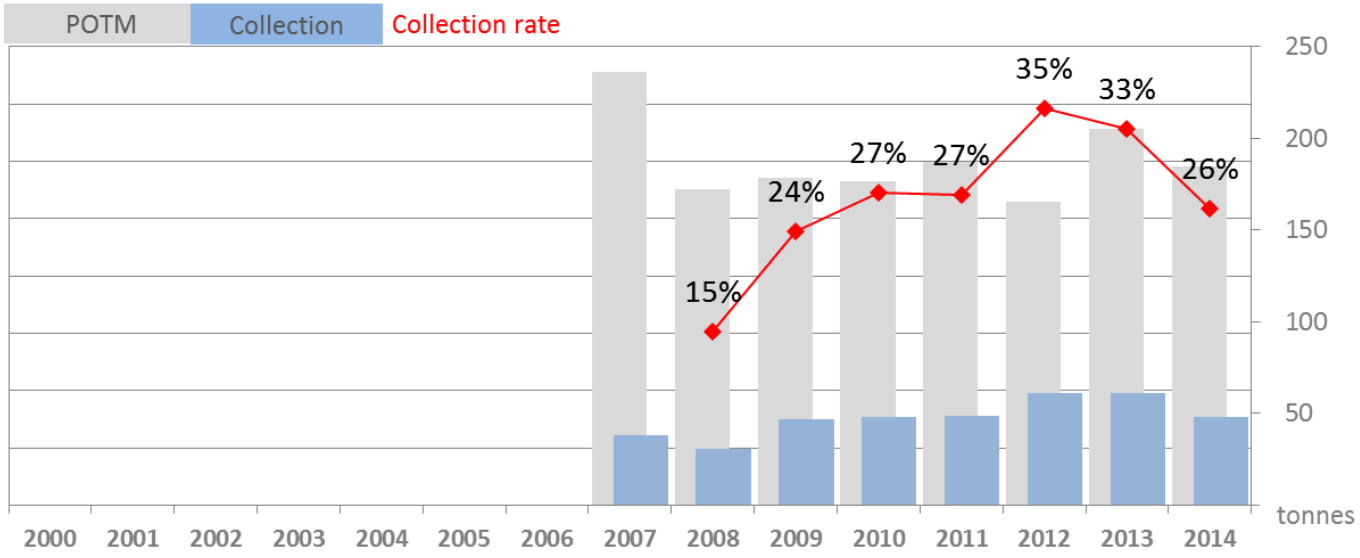
n.a.

Interface with WEEE organisations

In 2013, the Recycling Fund proposed the disposal of embedded batteries together with the WEEE. The Fund **replaced** the WEEE compliance organisations in 2015, **subjecting all imported or manufactured EEE to payments into the recycling fund.**

Collection results

A collection rate of 27% was achieved in 2010 and 2011. In 2012, POM decreased by 13% while collection increased by 20%, bringing the collection rate to 35%. In 2013, POM increased by 19% while collection remained stable, reducing the rate to 33%. **In 2014, the collection rate fell to 26% as collection decreased by -27% and POM by -11%.** The fund's spending per tonne increased by 20% in 2012 (to EUR 87,000 in total, EUR 1,424 per tonne).



Source: Icelandic Recycling Fund

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 470 waste portable battery collection points in Iceland, or one for every 700 residents.

The around 70 obligated municipalities contribute over 60% of waste portable battery collection, obligated retailers over 20% and schools about 8%. The collected batteries are subsequently picked up by waste service providers who process them and claim expenses from the Recycling Fund.

Number of collection points and share of collected batteries, estimate 2012:

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers serviced by organisations	150	22%
Municipalities	70	62%
Schools	150	8%
Companies	100	4%
WEEE dismantlers	3	4%

Source: Own estimates

Consumer awareness measures

Collection boxes from a 2007 initiative by the Recycling Fund and hazardous waste collector **EFNAMOTTAKAN hf**.

Consumer awareness and disposal behaviour

No surveys released.

Data accuracy

Given that POM does not take into account batteries in EEE, it is quite high at 590 g per capita.

Potential for improving collection rates

Implementation of the retailer take-back obligation would increase the comparatively low collection point density and increase the collection rate.

IRELAND

Key points

- Though producer responsibility for waste portable batteries has existed since 2004, no compliance organisation was set up until September 2008, when the two Irish WEEE organisations were also approved as the only two battery organisations (three years after their approval as WEEE organisations).
- The collection rate increased quickly: in 2011, three years after the start of the scheme, a collection rate of 29% was achieved. **In 2014, a collection rate of 33% was reached. In 2014, POM increased by 23% over 2013 to a peak of 504 g per capita (after having declined in each year since 2010) while collection increased by 10%.**
- Improved transparency requirements to create trust between organisations could be a basis for coordinating nationwide communication. Stricter reporting requirements for collectors to avoid potential loss of portable batteries to treatment outside of the organisations.
- **A Producer Responsibility Initiative (PRI) Review of the WEEE & Batteries regimes, released by the Government in 2014, recommended that battery public awareness campaigns should be conducted under a single brand. The assessment also provided detailed recommendations for meeting the EU 45% collection target in 2016.**

Regulatory parameters

Overview

Legislation stipulating producer responsibility for waste portable batteries had existed since 2004, but no compliance organisation had been set up prior to 2008. With the publication of the **Waste Batteries Regulations in July 2008**, Ireland became the fourth member state to complete transposition of Batteries Directive 2006/66/EC. Making 'enforcement of the regulations ... a key priority'[117], the comprehensive Regulations (68 pages - 25,000 words) go beyond those of any other end-of-life producer responsibility legislation in any member state. New Batteries Regulations published in June 2014 introduce minor changes, notably aligning enforcement related provisions with those of the 2014 WEEE Regulations.

Roles and responsibilities in waste portable battery collection

Retailers (distributors)

- must take back WPBAs free of charge from consumers at 'conveniently located appropriate facilities' at all reasonable times, at all sales outlets, even if no new battery is purchased. However, the retailer is not required to take back leaking batteries or quantities in excess of 5kg of WPBAs from any one person at one time. Retailers are prohibited from offering any discount on batteries to avoid the take-back obligations
- must not transfer waste portable batteries – except those integrated into EEE – to any party except the producer (or a collector acting on behalf of the producer) or an approved body; if registered in their local authority's register of distributors, the retailer may also deposit the collected waste at a civic amenity facility.
- must register by 15 September 2008 with their local authority's register of distributors, unless a) they are already registered as EEE distributors; or b) they store less than 250 kg of WPBAs; or c) they are registered with a compliance scheme representing retailers (which both collective schemes do). The distributor registration must also be renewed annually by 31 January.

[117] Quote by John Gormley, Environment Minister from May 2007 to February 2011 and former Chairman of the Green Party

- Distance sellers must place a visible and legible notice on their website, voice telephony services or other media from 16 September 2008 indicating that they will take back waste portable batteries free of charge in Ireland and giving address details of the take-back location

Local authorities

- must establish a register of distributors within their functional area by 1 September 2008.
- may designate any workplace, educational establishment or facility owned by an entity with not-for-profit status (CHY code) as a collection point or intermediate storage point, subject to the agreement of the management.
- must ensure that retailers offer free take-back, only distribute EEE and batteries from bona fide registered producers and dispose of them in accordance with the Regulations.

Producers or Compliance schemes acting on their behalf take back waste portable batteries from collection points on demand once a minimum 50kg of waste batteries are ready for collection. Take-back must take place no later than 20 working days after the request from the operator of a collection point. Compliance organisations issue a *certificate* to producers confirming membership which exempts the producer from registering with and reporting to the Registration Body directly, and from keeping records and informing consumers.

If a producer complies through an **individual organisation,** the producer must display signs at point of sale (POS) stating that an approved waste plan (including financial details) is available on request. If the producer does not take-back collected batteries within 20 working days of a request, the collection point host may manage waste portable batteries themselves and charge producers the actual management costs (including administrative, logistical and storage costs) plus an agency fee not exceeding 10% of the total.

Requirements on compliance organisations

Collective organisations are subject to approval by the Ministry of Environment. While they are not subject to requirements regarding their ownership or business objective, they

- may not be closed organisations for a limited number of producers or cover a limited geographical area only or cover only selected battery types;
- must disclose financial accounts to the Environment Ministry;
- must propose to the Ministry how they will build and maintain a contingency reserve;
- must give the Ministry details on how they intend to co-operate with other approved bodies and individual producers; and
- must demonstrate how they will determine and verify battery waste management targets and standards.

Development of compliance organisations

Though producer responsibility for waste portable batteries has existed since 2004, no compliance organisation was set up until September 2008, when the two Irish WEEE organisations were also approved as the only two battery organisations (three years after their approval as WEEE organisations). An application by a waste management company for approval of a third battery organisation was under preparation but eventually not submitted.

During the transposition of the WEEE Directive, the government initially foresaw a single organisation with a visible fee financing it to build up collection infrastructure quickly. However, it eventually approved ERP Ireland as a second organisation along with WEEE Ireland.

The two organisations operate in different geographical areas. Both act as registration schemes for battery retailers in their respective areas (which frees retailers from the administrative burden of having to register annually with local authorities). Both schemes have supplied collection boxes to registered retailers since September 2008.

Around 550 producers currently comply through the two schemes. There are no individual organisations for portable batteries.

- **WEEE Ireland** was set up by ICT, consumer electronics and household appliance manufacturers (including Apple, IBM, Microsoft, Dell, Siemens, Neff, Nordmende, Sanyo, JVC, Panasonic, Sharp, Philips and Whirlpool). It was approved by the Government on 4 August 2005. The joining fee for battery producers with a turnover of under EUR 250,000 per annum is EUR 600. In addition, there is an annual management fee of EUR 400. Discounts are provided to smaller producers.

- **ERP Ireland** was also approved on 4 August 2005. The national ERP organisations account for about 15% of the European WEEE market. ERP Ireland charges an annual fee of EUR 500, but no joining fee. It has around 75 members. Battery registration is free for existing WEEE members.

Market shares and clearing for over- and under-collection

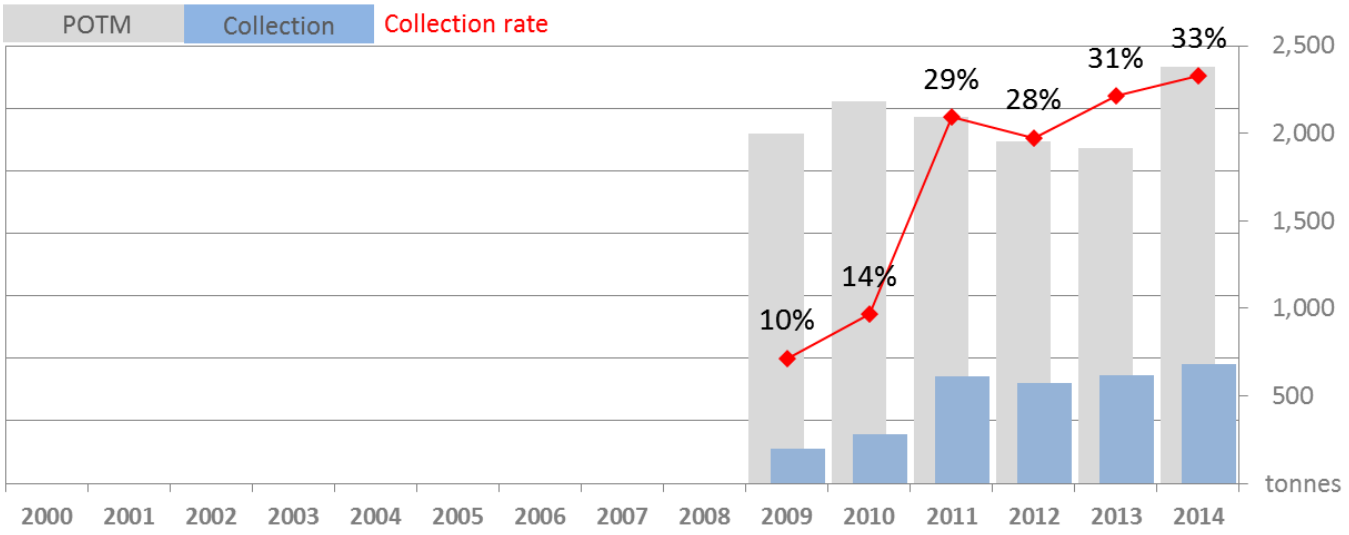
To avoid duplication, each organisation was given responsibility for WEEE in different Irish counties and Dublin city districts. Both organisations were originally allocated areas representing an equal share of the population, with equal average distances from reprocessors, but in May 2006 WEEE Ireland's share was increased to 80% of the population to reflect its actual share of EEE put on the market. From 2010, ERP's share increased to 28% when it took over all collection in Westmeath and Leitrim. For 2013, WEEE Ireland claims a 79% POM share of portable batteries and a 35% percent 'take back' rate. This suggests that ERP Ireland's return rate was 27% in 2013, up from 25% in 2012. **The POM market shares mentioned in the annual reports of the organisations are difficult to reconcile as they may be based on different data (e.g. ERP claims 28% of the 'compliance market'). The nominal collection volumes of the organisations show a ratio in 2014 of 22% (ERP) / 78% (WEEE Ireland) (2013: 18% / 82%).**

Interface with WEEE organisations

The WEEE organisations also act as waste battery organisations.

Collection results

The collection rate increased quickly to 29% in the first 3 years after the legislation came into force. **In 2014, a rate of 33% was reached. In 2014, POM increased by 23% over 2013 to a peak of 504 g per capita (after having declined in each year since 2010) while collection increased by 10%.**



Source: Environ.ie

Drivers affecting the collection rate

Availability of collection points and use of collection channels

We estimate that there are about 6,500 waste portable battery collection points in Ireland, or about one for every 720 residents.

Number of collection points and share of collected batteries, 2012 estimate:

Collection point host	***Number of collection points***	***Share of total waste battery collection***	***Share of total waste battery collection 2014***
Retailers serviced by organisations	5,500	30%	**31%**
Municipalities	300	30%	**30%**
Schools	700	5%	**6%**
Companies		10%	**13%**
WEEE dismantlers		20%	**13%**
Other		5%	**7%**

Source: Own estimates; ***2014 – WEEE Ireland***

Awareness creation measures

Supporting legal requirements:

The Batteries Regulations spell out **retailers' obligations regarding the visibility** of the take-back option in great detail. Distributors must display in store a sign of at least A4 size, font Times New Roman 20pt, black on white, 1.25 line spacing, that says: *"FREE RECYCLING - WASTE MANAGEMENT ACT 1996: Waste Electrical and Electronic Equipment (WEEE) is taken back free of charge in this store on a one-for-one, like-for-like basis. Waste batteries including rechargeable batteries (of a type sold here) are taken back free of charge in this store. You are not obliged to make any purchase when returning old batteries here. Each local authority must also accept household WEEE and small batteries free of charge at its recycling facilities. All WEEE and waste batteries must be recycled and should not be placed in your waste disposal or recycling bins. Make sure you always recycle all your old electrical goods and batteries."*

Moreover, any **advertisement for batteries** must include the text "Waste batteries must never be placed in your waste disposal or recycling bins. There is a bin for small batteries in your local store. Battery recycling is free".

Joint activities

'**Batteries back'**, the waste battery collection point location finder, is maintained by both organisations.

WEEE Ireland

- **Collection boxes for retail:** WEEE Ireland offers distinctive blue boxes, made of flame retardant corrugated plastics, for 5 kg of batteries. WEEE Ireland notes that 'the investment in these quality containers has given Ireland a national brand for battery recycling' and has been a 'very successful tool in delivering WEEE Ireland's brand message' since 2005. A larger green battery drum was discontinued due mainly due to potential fire risk arising from larger containers in schools and at retailers. To generate awareness among retailers, a pilot battery merchandising programme was launched in December 2009 to distribute collection boxes and compliance packs to retailers and inform them of their obligations, complemented by advertisements placed in trade magazines to raise awareness among the battery distribution and retail sectors. WEEE Ireland provides a pick-up service (through contractors) for 10 or more battery boxes (50kgs) from retailers, schools and other collection points.

Drum, discontinued

- **Collection boxes for households:** In early 2010, WEEE Ireland launched the '**My Battery Recycling Box'** campaign, which effectively distributed collection containers amongst households and offices. The launch of the campaign featured a photo-call with Irish boxing hero Katie Taylor at the National Stadium of Dublin where people were encouraged to '**box clever**'. The event was featured in numerous newspapers and publications. From May to September 2010, 95,000 of these boxes were distributed to households.

Cardboard desktop box for households

- **Charity, seasonal and sponsoring events:** **WEEE Ireland conducts annual public collection events in communities which are not serviced by civic amenity sites or retailers.** A battery collection event launched in 2011 **and again in 2014** involved the Children's Sunshine Hospital and Laura Lynn House (a children's hospice). Returned batteries generate a financial contribution to the charity on consumers' behalf. In late 2011, the Minister for the Environment (Phil Hogan), in collaboration with WEEE Ireland and ERP, launched a Halloween themed nation-wide battery take-back campaign. In 2011, WEEE Ireland sponsored a series of RTÉ television shows '**Room to Improve**', about home renovations.

- **Schools and education:** In partnership with Rehab Recycle, WEEE Ireland has been developing a pilot project to raise awareness of WEEE and batteries in schools. Presentations are held promoting the benefits of WEEE and battery recycling and schools are given 'school packs' containing flyers, posters and other materials. Since April 2006, over 500 Primary schools have been visited. **In 2013 WEEE Ireland launched a free battery recycling programme for schools named 'WEEE Pledge'. Currently over 1,300 schools participating in the programme.**

- **Internet & Social media:** In 2012 WEEE Ireland revamped its website and launched RecycleFree as a more end-user/consumer focused website.

ERP Ireland

- **Collection boxes:** ERP distributes bright red battery collection boxes and awareness material (posters, flyers etc.) to retailers and other organisations. ERP reports 3,500 collection points across the 8 regions in which it operates in retail outlets and other authorised collection points. To allow for 'greener battery collection' ERP suggests collection points should wait until they have collected at least 80kgs of waste portable batteries before requesting take back or – should this be a problem – to take the waste portable batteries to a local civic amenity site.

- **Campaigns:** ERP Ireland organises around 10 campaigns annually to promote WEEE and battery collection. Most campaigns target schools.
  - A December 2008 campaign '**Dreaming of a Green Christmas**' concluded the 2008 programme of 68 open days when the public could return WEEE. The campaign was repeated in 2009, this time with 24 open days.
  - In March 2009 ERP launched the campaign '**Be Free** …of your electrical waste and used batteries' in cooperation with retailers to promote recycling events.
  - In September 2011, ERP sponsored a fashion event named '**Junk Kouture**' in which designers competed to rework WEEE and batteries and other used materials and craft them into high-end couture fashion for both men or women. The event re-ran again in 2012 and will also run in 2013.
  - In October 2011, ERP launched the '**It's SCARY the amount of batteries that don't get recycled!**' over Halloween, targeting children.
  - During the 2012 holiday season, ERP, in association with numerous County Councils around Ireland, announced the launch of its '**Christmas Appeal**' campaign - aimed at encouraging people to have a Merry Green Christmas and recycle their batteries.
  - **In 2013 & 2014 ERP together with Scouting Ireland launched the initiative 'Recharge the Earth' to promote battery recycling among youth. Scouting groups compete by exchanging collected batteries for tree coupons, which entitles them to receive trees for planting.**
  - **In 2014 ERP launched the 'Go Recycle and Win' campaign. Schools compete by collecting waste portable batteries and the winning school is awarded an ERP funded party.**



Consumer awareness and disposal behaviour

According to WEEE Ireland, public awareness of WEEE Ireland and its activities increased from 54% in 2011 to 84% by the beginning of 2013. 77% of respondents were aware of the distinct blue battery collection boxes located at retailers. 31% of respondents were said to have returned a waste battery in the past 12 months. In terms of return behaviour, 65% of respondents used general supermarkets (Aldi alone, 25%).

Accuracy of reporting

POM: According to WEEE Ireland, challenges regarding POM reports are inaccurate reporting through misplacing of decimal points and also the inability to distinguish unambiguously between portable and industrial batteries. Moreover, potential reporting inaccuracies are suspected regarding batteries placed on the market in EEE. Following a comprehensive compliance review and audit of 164 producers in 2013, WEEE Ireland will recommend to the Register that it considers requiring battery POM to be reported in units as well as weights in order to help producers and the Register to identify incorrect reporting at an earlier stage.

Free-riders: Ireland's enforcement of the WEEE Regulations (and subsequently also the Batteries Regulations) has been among the strictest of all member states. As early as 2005, EPA inspectors began checking compliance of exhibitors at trade exhibitions, working closely with the Customs and VAT authorities. Nationwide checks on retailers (in their function as importers) were carried out for several months each year from 2006 to 2008. From 2010 to 2011, the EPA carried out roughly 80 inspections of EEE producers (40 targeting potential non-registration and 40 verifying B2B producer data), 20 inspections on distance battery sellers, more than 600 inspections on distributors and around 50 RoHS-related inspections. The Irish EPA has completed over ten successful prosecutions.

Collection: WEEE Ireland recently conducted research on the distinction between waste portable and industrial batteries (especially lead acid batteries). Waste portable batteries potentially not accounted for are suspected to occur as a result of exports of WEEE and lead acid battery by collectors and mobile phone (batteries) collection by charities.

Potential for improving collection rates

The collection rate may be improved through measures in the following areas:

- Increasing transparency to create trust between organisations as basis for coordinating nationwide communication, for example by making information publicly available on the type and number of collection containers used and clearer funding requirements for organisations.
- Stricter reporting requirements for collectors to avoid potential loss of portable batteries and treatment outside of the organisations. WEEE Ireland's 2013 annual report notes that 'Ireland needs a transparent and equitable reporting organisation to ensure that all producers and operators are describing [portable, industrial] batteries consistently. A benchmarking exercise with other European member states and schemes is required for harmonisation purposes and to ensure Ireland is not at a disadvantage from national reporting guidance and practice.'

A report, entitled 'Review of the Producer Responsibility Initiative Model in Ireland', released by the Department of the Environment, Community and Local Government (DECLG), made recommendations to boost the collection rate, notably concerning consumer behaviour and collection practices. These included:

- **Waste battery public awareness campaigns should be conducted under one brand to circumvent public confusion previously manifesting from the existence of two compliance organisations conducting independent campaigns in different communities;**
- **Longer opening hours for civic amenity sites and incentives for civic amenity sites to increase collection (e.g. reimbursement of the collection costs);**
- **Improved collaboration between retailers and compliance organisations;**
- **Implementation of reward/incentive based models to increase collection from the public (e.g. vouchers issued for certain volumes of returned waste batteries);**
- **Investigating the possibility of kerbside battery collection.**

ITALY

Key points

- Decree 188/2008 transposing Batteries Directive 2006/66/EC entered into force on 18 December 2008. About 2,500 battery producers currently comply through 13 organisations for portable batteries of which all except COBAT originate from WEEE organisations. The coordination centre CDCNPA, which acts as interface between all organisations and collectors including municipalities, became operational in late 2012.

- Coordination Centre data show that a collection rate of 25% was reached in 2011, the second year after the take-back obligation came into force. **A collection rate of 36% was reached in 2014, helped by consistently falling POM (2014 POM was 17% lower than in 2011) and steadily increasing collection (+28 over 2011).**

- The legal framework, with its requirement for organisations to join the coordination centre, provides a level playing field for the different actors and a platform for coordinated awareness creation. Time is now needed to increase consumer awareness and disposal behaviour and improve control of material flows.

Regulatory parameters for compliance organisations

Overview

Decree 188/2008 transposing Batteries Directive 2006/66/EC entered into force on 18 December 2008. The Decree provides for multiple compliance organisations to be set up [earlier drafts named the national lead acid battery consortium COBAT as the single compliance organisation for all battery types] and replaces permit requirements for organisations with a self-regulatory approach that is implemented through the compulsory participation of organisations in a Coordination Centre. An **amendment to the Decree**, in force from April 2011, strengthens the role of the Coordination Centre and allows organisations to use municipal facilities for battery collection under a framework agreement with ANCI (Association of the Municipalities). There have been no **significant** legislative changes since 2011.

Roles and responsibilities in waste portable battery collection

- **Producers** or third parties acting on their behalf must organise and finance collection and treatment either individually or collectively.

- **Collective organisations** must provide the same conditions for all producers and all municipalities under an agreement with the National Association of Italian Municipalities (ANCI).

- All organisations and individually complying producers must join a single, government approved **Coordination Centre**. The Centre optimises the activities of the organisations to ensure homogeneous geographical coverage and uniform operating conditions and gathers collection and treatment data for transmission to the government. The Coordination Centre will set criteria for allocating costs among producers, taking into account the types and characteristics of batteries, the collection rate, the geographical location of collection points, and the value of metals derived from recycling.

- **Municipalities** may collect batteries, but are not obliged to do so.

- **Distributors** of batteries must take back batteries from the public free of charge.

Requirements on compliance organisations

Collective organisations are not subject to approval or disclosure requirements vis-à-vis the authorities but must:

- Register with their chamber of commerce
- Join the Coordination Centre and ensure that all parties and municipalities can participate according to the same conditions, including entities importing batteries from countries outside the EU.

Development of compliance organisations

About 2,500 battery producers (all types) currently comply through 13 organisations for portable batteries (**list**) of which all except COBAT originate from WEEE organisations.

Since 1988, the COBAT battery organisation had dominated battery waste management in Italy. COBAT was originally established as a national consortium for lead batteries only, but had since built up collection networks for all battery types which would enable it to act as a national organisation for portable batteries. In September 2008 President Berlusconi approved a draft Decree-Law transposing Batteries Directive 2006/66/EC to that effect, naming COBAT as the single compliance organisation for portable batteries. However, the Competition Authority and Confindustria, the umbrella organisation of Italian Industry (and ANIE, the EEE producers' federation) objected and Environment Minister Prestigiacomo eventually implemented a multiple compliance organisation approach in the Waste Batteries Decree.

Interface with municipalities

The dispute then continued as its focus shifted to the control of the Coordination Centre. Like the Italian WEEE Decree, the Batteries Decree requires all collective battery organisations and individually complying producers to finance and join a SINGLE Coordination Centre to ensure homogenous battery collection throughout Italy.

On 23 December 2008, five days after the Battery Decree entered into force, a Coordination Centre for Batteries and Accumulators (**CdCPA**), initiated by Syracuse-based WEEE organisation RAECYCLE and supported by COBAT, was established. Three months later, ANIE – which had initiated the Coordination Centre for WEEE – announced the constitution of a second Coordination Centre for Batteries and Accumulators (**CCNPA**). ANIE's CCNPA claimed to have the support of over 90% of portable battery producers (including DURACELL, ENERGIZER, PANASONIC, BEGHELLI, SONY, VARTA and PHILIPS).

Both Centres worked independently, coordinating the organisations' battery take-back operations in the same regions. It took until June 2011 for the two competing, unapproved Coordination Centres to agree to unite.

In November 2012, a new National Coordination Centre for Batteries and Accumulators (**CDCNPA**) signed an **agreement** ANCI. The agreement is required for the Government's approval of the Coordination Centre, and i.a. requires collection centres to register with CDCNPA, and defines the operational parameters for take-back and the compensation paid to municipalities for waste battery collection (minimum EUR 70 per tonne). CDCNPA's take- back coordination of waste batteries collected at municipal collection points, retail outlets and WEEE treatment facilities began in July 2012 and has been fully operational since late 2012.

Market shares and clearing for over- and under-collection

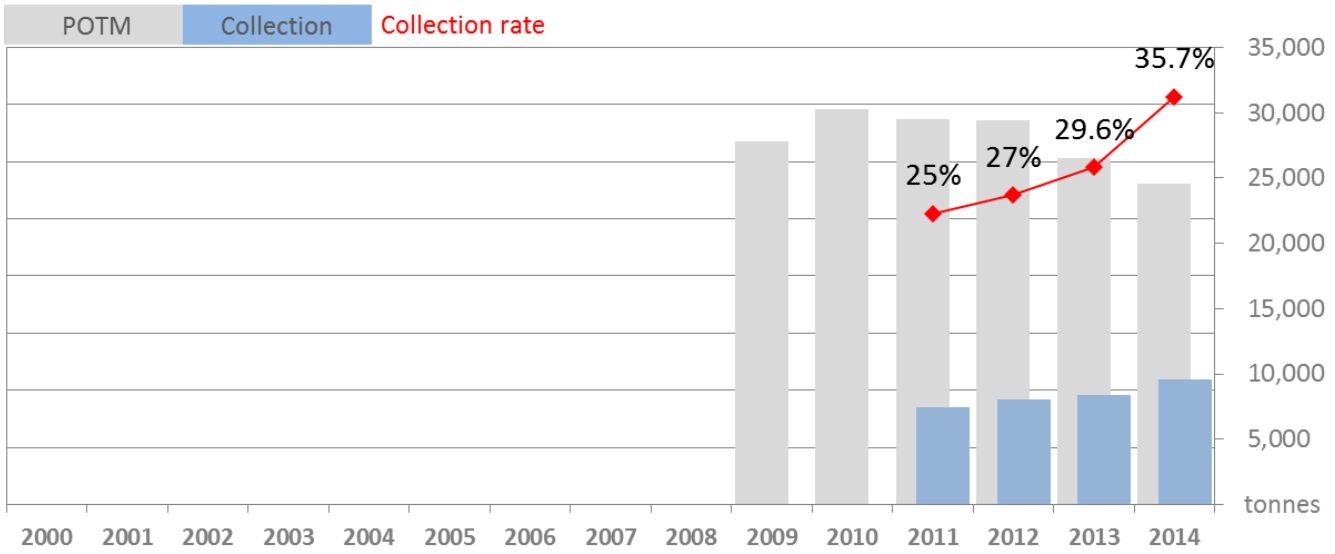
Coordination centre CDCNPA assigns pick-up requests from waste battery collection points to organisations and individual producers on the basis of geographical areas, taking into account the organisations' market shares.

Interface with WEEE organisations

Waste batteries arising at WEEE dismantlers are also subject to CDCNPA coordination. Moreover, all larger battery organisations except COBAT are also WEEE organisations. As such, the possibility of deliberate leakage of waste batteries from dismantlers is considered low.

Collection results

Coordination Centre data show that a collection rate of 25% was reached in 2011, the second year after the take-back obligation came into force. **A collection rate of 36% was reached in 2014, helped by consistently falling POM (2014 POM was 17% lower than in 2011) and steadily increasing collection (+28 over 2011).** However, the Coordination Centre's data, in particular POM, do not fully reflect the entire market[118] and the Centre does not have access to national data.



Source: CDCNPA; Data do not fully reflect those declared to national authorities

[118] Reasons: a) The reporting of POM to the Centre is not mandatory for compliance organisations. b) the Centre's data do not include those of individually complying producers (e.g. producers of B2B EEE with integrated batteries) as they are not required to join the Coordination Centre. c) There are no penalties for compliance organisations that do not join the Centre and reportedly a few of these exist.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

The following entities may register waste battery collection points with CDCNPA: municipal collection centres, retailers, WEEE treatment facilities and large battery users (with minimum waste batteries arising of 400 kg per year from e.g. hospitals, universities, airports, but not companies involved in waste management).

By late 2012, about 2,000 waste portable battery collection points were directly *registered* with the CDCNPA **(2014: 3,809 collection points)**, or one per 30,000 residents. However, this number does not reflect the amount of actual collection points available to end-users as it does not include all municipal collection points nor those at retailers who submit the waste batteries they collect to municipal collection points.

85% of collected batteries derived from municipal collection points in 2012. Despite the comparatively high share of waste batteries from WEEE treatment facilities, CDCNPA notes that many WEEE facilities remain unregistered with CDCNPA.

Number of collection points and share of collected batteries, estimate **2014:**

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	**1,000** (2012: 854)	**1%** (2012: 1%)
Municipalities	**2,500** (2012: 1,111)	**81%**[119] (2012: 85%)
Schools	(2012: 0)	0%
Companies	(2012: 3)	1%
WEEE dismantlers	(2012: 31)	**18%** (2012: 13%)

Source: CDCNPA

Awareness creation measures

Supporting legal requirements

Retailers must put signs at the point of sale informing customers about the free return of spent batteries and the dangers to health and environment of wrongly disposed-of waste batteries.

Producers of PBAs are responsible for informing consumers 'throughout the organisation'. CDCNPA should coordinate consumer awareness measures.

Measures by the organisations

Coordinated awareness measures are being gradually rolled out as the Coordination Centre starts operations. Currently there are initiatives by each organisation.

[119] **27% from municipal collection points directly + 54% from voluntary collectors**

- **Remedia:** Remedia provides collection boxes to retailers and is engaged in social network initiatives such as Facebook, Twitter and YouTube.

- **ERP** distributes collection boxes and holds province-wide competitions between schools to boost public awareness.

- **Ecolight distributes collection boxes of various sizes**

- Various recyclers and municipal waste service providers supply battery collection boxes of varying designs on behalf of organisations:

Ecoemme and Auesse

LeoDaVinci

2015: Eco-Recovery

Consulprogett

Rimondi Paolo

Auesse

Consumer awareness and disposal behaviour

No surveys have been conducted yet.

Accuracy of reporting

Producers report **POM** volumes broken down into chemistries (see table below and according to whether they are primary and secondary batteries. It is not possible to distinguish battery volumes integrated into EEE.

Primary	***Secondary***
Zinc – carbon	Lead acid
Zinc chloride	Nickel – Cadmium
Alkaline	Nickel–metal hydride
Lithium	Lithium
Zinc-air	
Silver – zinc	
Other	

Collection reporting: A chemistry breakdown of collection volumes is not available. CDCNPA notes that there are not enough codes in the European Waste Catalogue to distinguish portable and industrial or automotive batteries: WEEE dismantlers must provide collection reports separated into five EWC codes[120]. Collection reports from Municipalities and from commercial sites are provided by only 2 EWC codes[121]. Neither allows distinguishing between portable and industrial or automotive batteries.)

Enforcement: Italian law provides for enforcement measures with regards to the failure to register in the producers' register. No enforcement measures have been carried out yet.

Potential for improving collection rates

The legal framework with its requirement for organisations to join the coordination centre provides a level playing field for the different actors and a platform for coordinated awareness creation. Time is now needed to increase consumer awareness and disposal behaviour as well as to improve control of material flows.

120 [16 Wastes not otherwise specified in the list] 16 06 01* lead batteries; 16 06 02* Ni-Cd batteries; 16 06 03* mercury-containing batteries; 16 06 04 alkaline batteries (except 16 06 03); 16 06 05 other batteries and accumulators; * hazardous

121 [20 Municipal wastes] 20 01 33* batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries; 20 01 34 batteries and accumulators other than those mentioned in 20 01 33* hazardous

LATVIA

Key points

- A separate collection organisation for batteries from households was introduced in 2001, managed by hazardous waste management company BAO. A Natural Resources Tax (NRT) has applied to separately sold batteries since July 2006, and since January 2011 also to batteries in EEE. Producers could be exempted from the tax by achieving collection targets (25% since 2010). In 2006 five WEEE organisations were approved as battery organisations. Legislation transposing Batteries Directive 2006/66/EC came into force in May 2011, **while the NRT – significantly increased from 2014 – continues to be maintained as enforcement instrument.** About 15 waste management companies and producer controlled organisations as battery organisations, of which BAO is the largest.

- A collection rate of over 28% was achieved in 2013, **moving up to 29.5% in 2014 despite a strong increase of POM (+21%). Since 2011, collection has increased on average 6% per annum, POM 8%.**

- Collection volumes might be increased by improved coordination among the organisations with regards to ensuring a high density of collection points and creating economies of scale for awareness creation measures. In addition, retailers could be incentivised to display collection boxes visibly.

Regulatory parameters

Overview

The **Natural Resources Tax (NRT) Act** has applied to separately sold batteries since 1 July 2006. Producers could be exempted from the tax by achieving collection targets of 15% - 25% for primary batteries and 60%-80% for accumulators. Since 2010, the target has been 25% for all battery types. Batteries Directive 2006/66/EC was transposed through an **amendment of the Waste Management Act in 2008** and a number of **Cabinet of Ministers Regulations**. Regulations on the registration of battery producers did not come into force until May 2011. After a long awaited amendment, the NRT Act applied the tax to batteries integrated into appliances (including imported second-hand equipment) from 1 January 2011. A Regulation specifying requirements for battery collection and treatment as well as reporting procedures followed in July 2011. **An amendment to the NRT Act significantly increased the tax rate from 2014 (rather than raising the collection target, which some compliance organisation would not have met). In 2014, Regulations on producer registration procedures were revised.**

Roles and responsibilities in waste portable battery collection

- Since 1 July 2006 **producers** have been responsible for financing collection and treatment of batteries. They have three compliance options: Setting up an individual organisation, joining a battery management organisation or paying the Natural Resources Tax. The NRT is payable on 100% on all types of batteries put on the market. To be exempt from the NRT, a producer had to reach minimum collection targets of 25% for all battery types since 2010. **From 2014, the rate has been EUR 11,000 per tonne (before EUR 6,900) for primary batteries, EUR 4,000 (before EUR 2,600) for NiCd and NiFe accumulators, EUR 740 for lead accumulators and EUR 17,030 (before EUR 10,800) for all other rechargeable batteries.**

- Approved **waste battery management organisations** must collect in all 10 administrative household waste management regions[122].

[122] Latvia's 2009 administrative reform turned 26 districts into 110 municipalities and 9 republican cities. However, the national waste management plan divides these 119 entities into 10 'household waste management regions', based on the available landfills each of which should only serve the waste management region in which it is located.

- **Retailers** are obligated to take back waste batteries free of charge even if no new battery is purchased. Wholesalers are not obligated to take back waste batteries from retailers. There are no de minimis exemptions.

- **Local authorities** are not obligated to collect.

Requirements on compliance organisations

Waste battery management organisations must collect in all 10 regions, have an approved waste management plan and sign an agreement with the Ministry of Environment. There are no requirements on the parties controlling the organisations.

Development of compliance organisations

Separate collection for all types of household batteries was introduced in summer 2001. The scheme was managed by hazardous waste management company **BAO**, which set up collection boxes for used batteries in supermarkets, photo shops and collection stations for sorted waste across the country. Collection was free of charge for consumers.

In accordance with Cabinet of Ministers Regulation No. 117/2002, producers and importers of batteries had to take back batteries. However, the first battery management organisations were not set up until summer 2006, when all five WEEE organisations (except the one for lamps) were approved as battery organisations.

As a background to the development of the battery organisations, here is a brief summary of the development of the WEEE organisations: until late 2005 the planning of WEEE organisations was hampered by uncertainty over the role of the Natural Resources Tax Act in financing historical waste. This situation continued until the regulation defining exemptions from the tax was issued in May 2006. As the WEEE Regulation does not mention collective organisations of producers, but refers instead to WEEE management organisations without reference to the controlling parties, the Ministry of Environment signed memoranda of understanding with Eko Gaisma (Ecolight), packaging organisation Green Dot Latvia (LZP), and Latvia Green Electronics (LZE), a collective organisation set up by LETERA in November 2005. This provided these organisations with the certainty needed to prepare their business plans and start customer recruitment. The organisations received Ministry of Environment approval two days before the NRT legislation came into effect in June 2006.

By August 2013, over 500 battery producers had registered, up from 210 two years earlier. The increase is mainly a result of the NRT now also applying to batteries integrated into EEE. Most of the registered producers comply through three organisations: ZAĻĀ JOSTA (Green Belt), Green Dot Latvia (LZP) and Latvia Green Electronics (LZE). The Ministry of Environment **lists** 15 organisations – both waste management companies and producer controlled organisations - that may act as compliance organisations for producers.

- **ZAĻĀ JOSTA** (Green Belt) was founded by a group of waste management companies in 2002 as a packaging recovery organisation and subsequently expanded to WEEE, batteries, tyres and oils. Through its partner BAO, Zala Josta has collected batteries and accumulators since 1 July 2006. About 50 battery importers are members. **BAO** was established in 1996 as a specialist hazardous waste management company.

- **Green Dot Latvia** (LZP): The packaging compliance organisation LZP (Latvijas Zalais Punkts), was set up in January 2000. LZP also covers other goods potentially harmful to the environment, such as oils and tyres. It has about 200 members for battery compliance (and around 1,000 for packaging and 300 for WEEE). Batteries have been taken back since 1 July 2006.

- **Latvia Green Electronics** (LZE) was set up in November 2004 by **LETERA**, the Latvian Electrical Engineering and Electronic Industry Association and LDTA, the Latvian Computer Technologies Association. It has 105 battery members.

Market shares and clearing for over- and under-collection

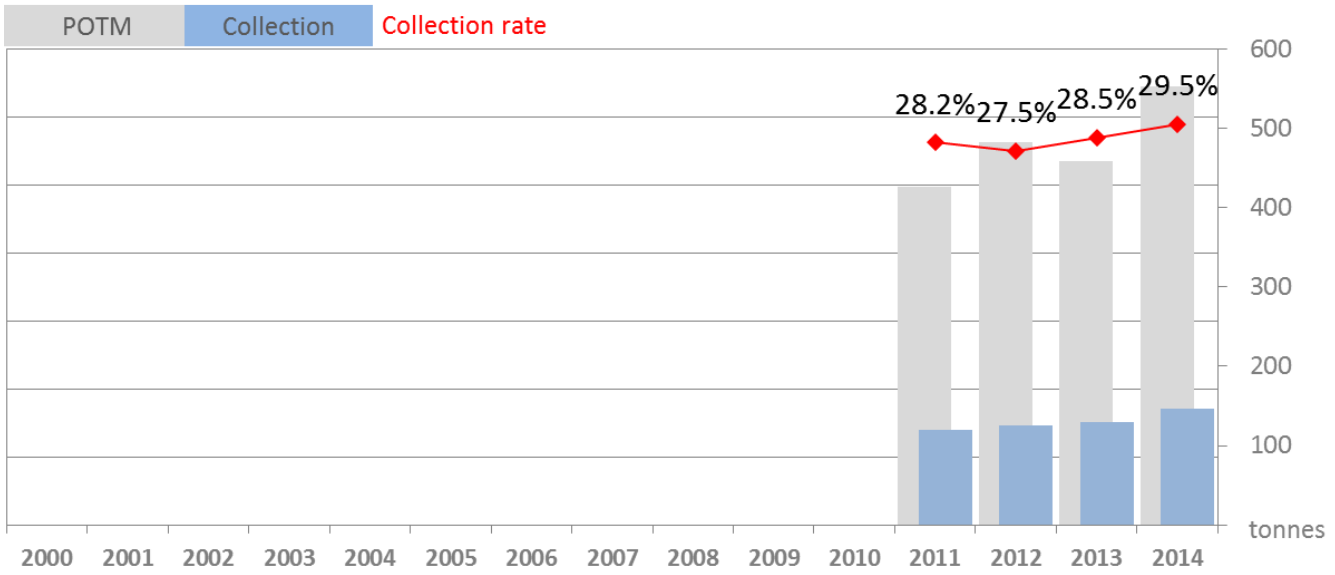
As organisations have to reach collection targets individually, there is a limited need for clearing for over- and under - collection.

Interface with WEEE organisations

13 of the 15 battery organisations also act as WEEE organisations and this creates synergies in collection coordination and reporting between the two waste streams.

Collection results

A collection rate of over 28% was achieved in 2013, **edging up to 29.5% despite a strong increase of POM (+21%).**



Source: Compliance organisations, MoE

Drivers affecting the collection rate

Availability of collection points and use of collection channels

Based on partial data from organisations, we estimate there are around 6,000 waste portable battery collection points in Latvia, or one per 370 residents. Collection points at retailers contribute an estimated 2/3 of all collected waste batteries, followed by schools and WEEE dismantlers. Municipal collection points play a minor role.

Number of collection points and share of collected batteries, estimate 2012:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	No data	60%
Municipalities		No data
Schools		
Companies		
WEEE dismantlers		

Awareness creation

Supporting legal requirements

Organisations must conduct four campaigns per year.

ZAĻĀ JOSTA (Green Belt) / BAO

- **Collection boxes:** Over 3,000 collection boxes **and posters** distributed to schools, offices and retailers for portable batteries and small accumulators e.g. mobile phones, including 'ECO PACK' battery collection boxes (picture).

- **Campaigns:** The coverage of all separately collected wastes allows BAO and other waste management companies to conduct broad awareness creation measures, educating end-users and especially children and students about waste separation in general. Campaigns targeted at younger age groups include school **collection competitions**, an educational film, entitled '**Better way**' (explaining the harmful effects of batteries on the environment and what to do with them in 15 minutes) and an online game.



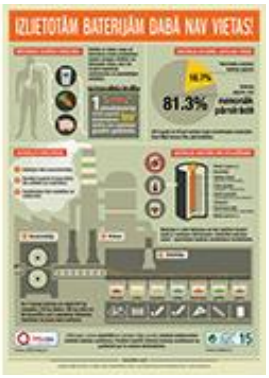

LZE

- **Collection boxes:** LZE has developed collection containers designed to stand out. The boxes are branded under as **Eleco**, a trade mark used also by and introduced on request of waste collection companies. The containers show a freephone number for consumers to obtain further information. Each cylinder has a capacity of 30 kg. 10 kg laminated cardboard collection boxes are also available.

- **School campaigns:** In the first quarter of 2012 LZE launched the 'student excursions to battery recycling plants' campaign where classes from various schools visited battery recycling plants to learn about the importance of recycling batteries. The campaign targeted children and young people up to 20 years and used predominantly web-based advertising.

LZP

- **Collection boxes: LZP delivers free waste battery collection buckets to businesses and retailers.**



- **Campaigns: A campaign running since 2011 offers points to participating businesses for full battery collection buckets which can be exchanged for prices. Spot prizes are also drawn periodically where gift vouchers are awarded to winning participating businesses.**

Consumer awareness and disposal behaviour

No surveys available.

Accuracy of reporting

Reporting: There are 2 reporting organisations for all battery types: The natural resources tax is calculated based on chemistries (lead accumulators, Ni-Cd and Fe-Ni accumulators; Primary batteries; Other) but not battery type (portable, industrial, automotive), while the producer responsibility organisation requires distinction by battery type to be exempt from the NRT. As the NRT law is the overriding legislation, collection reporting focuses on the chemistries.

Enforcement: Organisations must audit at least 15% from POM. The Government has carried out enforcement actions against free-riders and erroneous reporting. Errors are most likely in the reporting of batteries integrated in EEE.

Potential for improving collection rates

While the natural resource tax creates an incentive for organisations to achieve their targets, collection volumes might be increased by requiring battery organisations to increase density of collection points, in conjunction with enforcement of retailers' obligation to display collection boxes visibly. Moreover, coordination among the organisations with regard to consumer awareness measures would probably greatly improve their effectiveness.

LITHUANIA

Key points

- Since 2003, producers have had to pay an **environmental pollution tax** (EPT) on batteries. From 2008, producers could avoid the tax if they achieved collection targets by buying recycling notes from recyclers or through collective organisations. The collection target was lowered from 80% in 2011 to 25% in 2012, but the tax effectively increased by a factor of 6, which boosted the membership of the two producer controlled compliance organisations.

- The collection rate increased from 26% in 2010 to a peak of 35% in **and fell to 33% in 2014, as collection declined by -11% and POM by -16%.**

- Both the EPT and the producer responsibility regulations are very complex, inconsistent and subject to frequent changes. A better alignment of the two could significantly simplify compliance and contribute to more robust data flows.

Regulatory parameters for compliance organisations

Overview

Unlike EEE, all batteries have been subject to an **environmental pollution tax (EPT)** in conjunction with a collection target since 2003. From 2006 to 2011 the collection target was 80% of batteries placed on the market, and the 25% target of the Directive only applied from 2012. Since 2007, the tax has been LTL 500, or EUR 144[123], per tonne, charged on 80% of the batteries put on the market minus the amount of waste batteries collected as shown on recovery notes purchased by producers from waste management companies or collected by a collective organisation.

Batteries Directive 2006/66/EC was transposed through an **amendment of the Waste Act in June 2008** and implementing orders. The key change introduced by the amendment was the introduction of collective compliance organisations as one of the three compliance options. However, due to the low tax rate, producers preferred to pay the tax rather than support organisations' investments in collection infrastructure. The government therefore increased the tax from 2012. The transposition of the Recast WEEE Directive in 2014 revised reporting and registration procedures for battery producers. **An amendment in 2015 transposed Council Directive 2013/56/EU.**

Roles and responsibilities in waste portable battery collection

- **Producers** must achieve collection targets[124], set up a collection network and inform consumers about separate collection. They have the following compliance options:
    a) Until end 2012: buying a guarantee note (recovery note) issued by a waste management company;
    b) Legally available since 26 September 2008: Membership of a licenced collective producer organisation or individually;
    c) Paying the EPT (environmental pollution tax). Since 2007, the tax has been EUR 144 (before 2015 the equivalent LTL 500) per tonne on all types of batteries. The tax is charged on 80% of batteries put on the market minus – if applicable – the amount of waste batteries collected as shown on recovery notes purchased from waste management companies or – since 26 September 2008 – the amount of waste batteries collected by a collective organisation.

123 **Lithuania adopted Euro from 2015**

124 Governmental Resolution No 1643 of 2002 set collection targets from 2003 onwards. From 2006 to 2011 the target was 80% of batteries placed on the market. The transposition legislation introduces the 25% target of the Directive only from 2012.

- **Municipalities** are not required to set up collection points for waste batteries, but are required to take them back if consumers bring them to any municipal collection point.

- **Retailers** must take back waste batteries free of charge.

Requirements on compliance organisations

Collective organisations established by producers must be licensed A organisation

- may only conduct activities necessary for the fulfilment of the producers' obligations; and
- must be licensed (which is subject to approval of its operational waste management plan, financial plan and plan on information to users);
- must offer collection according to population density criteria (which translate into at least 3,000 collection points nationwide.[125]

Development of compliance organisations

Until 2011, the NRT was lower than the cost of setting up and running a take-back organisation, so it was the preferred compliance choice for producers. In 2012, the effective tax rate (nominal tax x collection targets) for portable batteries increased from about EUR 116 to EUR 724 per tonne placed on the market and by 2016 it will have increased to EUR 1,300 per tonne.

Individual compliance typically requires purchasing guarantee (or recycling) notes directly from recyclers. This service is offered by about 10 waste management companies. Only a few offer nationwide collection, notably:

- **EMP Recycling, which** dominates the waste management market. Established in Lithuania in March 1999, EMP operates purchasing, collection, recycling and sale of secondary raw materials. EMP is active in the three Baltic States, Poland and Sweden.

- **Zalvaris,** originally a scrap metal dealer, operates the Government's battery collection programme and also sells recovery notes to battery producers.

As regards collective compliance, two collective organisations compete for producers' funding:

- **EEPA Collective organisation:** EEPA received a licence for the take-back of batteries in December 2009. It had been approved as a WEEE organisation since May 2006. Its founders include EEPA (the Association of Manufacturers and Importers of EEE, itself set up by 7 members of the INFOBALT association). Its 320 members include national branches of Whirlpool and Electrolux. EEPA cooperates with **NETA**, the National Association of Electronic Retailers.

- **GIA Organisation** (Gamintojų ir Importuotojų Asociacija, Association of Producers and Importers, formerly Biosistema): According to the Ministry, GIA has been licensed for the take-back of batteries since February 2008.

In anticipation of the tax increase, producers joined WEEE/battery organisations GIA and EEPA and the share of batteries placed on the market by their members increased from 30% in 2009 to over 80% in 2011.

[125] **Order D1-386** part IV specifies at least 1 collection point per 800 inhabitants in major cities, at least 1 point per 1000 inhabitants in other cities, and also 1 point in villages below 1000 inhabitants Footnote should be on next page

Market shares and clearing for over- and under-collection

As organisations have to achieve collection targets individually, there is a limited need for clearing for over- and under-collection.

Interface with WEEE organisations

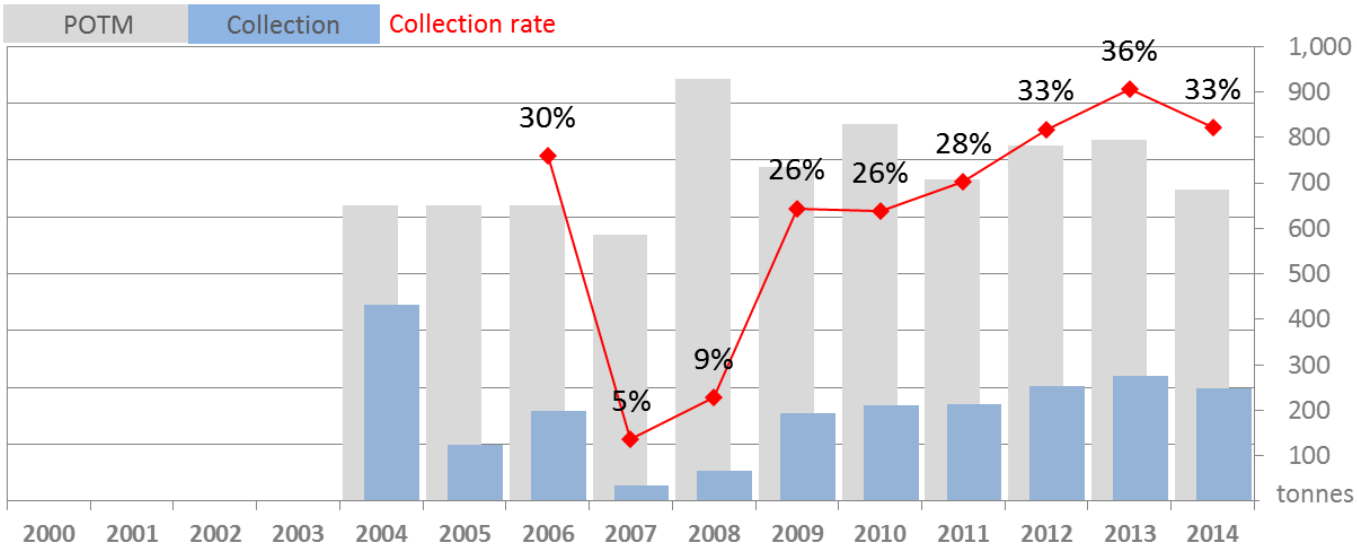
The main battery organisations also collect WEEE (except GIA from 2013) thus creating synergies in collection coordination and reporting between the two waste streams.

Collection results

The collection rate increased from 26% in 2010 to a peak of 35% in **2013 and fell to 33% in 2014, as collection declined by -11% and POM by -16%.**

In 2011 the overall collection rate (all batteries) was 52% on a current year basis, below the 80% national collection target. However, the target has been applied independently to different battery chemistries and has always been reached for rechargeable batteries. For primary batteries, the target had never been achieved until it was lowered to 25% in 2012.

Note: About collection rates mentioned in the 2014 update of this report: The 2011 collection rate data had to be significantly revised downward compared the 2013 report (from 46% to 28%)[126], **and the collection rate for 2012 and 2013 was shown as 28% due to a formula error.**



Source: Post 2011: Different Government sources; Before 2009: MoE[127] and various sources

126 Presumably different agencies from which we sourced the data had different data sets available.

127 The Ministry of Environment attributes the wide fluctuation of collection data to changes in the reporting organisation.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

Based on partial data from organisations, we estimate that there are around 9,000 waste portable battery collection points in Lithuania, or one per 360 residents. Partial data from organisations suggest that most waste batteries are collected through retail outlets.

Number of collection points and share of collected batteries, estimate 2011: Put whole table on same page

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	6,000	
Municipalities	200	
Schools	1,000	No data
Companies	1,900	
WEEE dismantlers	30	

Source: Own estimates based on partial organisation data

Awareness creation measures

Supporting legal requirements:

Requirements regarding public awareness and education measures[128] for products subject to producer responsibility obligations go into far greater detail than those of the EU Directive. Producers must i.a. carry out a certain number of measures such as placing mandatory information on websites and in promotional publications at the point of sale.

EEPA-Žalvaris

Since 2012 EEPA and Žalvaris have established a joint collection network under the name EEPA-Žalvaris

- **Collection boxes:** Black battery shaped containers and buckets are placed in supermarkets, schools and post offices. In 2012, EPA distributed collection boxes to about 6,000 locations (up from 4,000 in 2011), almost all of them at points of sale in EEPA members' stores, such as Topo Centras home appliance stores, Maxima, Iki and NORFA. EEPA-Žalvaris places easily recognisable black and orange battery collection boxes in retailers' stores, supermarkets, offices, post offices **and gold coloured metal containers at municipal collection sites. In mid-2014 EEPA launched a two-tier box for the collection of lamps and waste batteries.**


[128] Detailed in Order D1-554/2012

2015:

GIA

- **Collection boxes:** GIA distributes buckets as collection boxes. They are accompanied by educational posters and flyers.

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

The reporting accuracy suffers from non-alignment of the reporting requirements for the producer responsibility and NRT legislation:

- Under the producer responsibility legislation[129], portable batteries POM reports must be broken down into 11 chemistries[130]. Collection reports are taken from the NRT reporting which does not allow distinguishing by battery type.
- The EPT law requires POM and collection reporting by some European waste codes[131] (on a per unit basis except for primary batteries), without distinguishing battery types (portable, etc.).

Battery reporting for both organisations relies largely on the latter distinctions as the NRT is the overriding legislation.

Potential for improving collection rates

Both the product tax and the producer responsibility regulations are very complex, inconsistent and subject to frequent changes. A better alignment of the two could significantly simplify compliance and contribute to more robust data flows.

129 Detailed requirements in Annex 7 of the Order on reporting D1-209/2009 (amended 2010 and 2012)

130 Alkaline manganese, zinc carbon, lithium oxide, zinc air, silver oxide, nickel cadmium, nickel metal hydride, lithium, sealed lead-acid, mercury, other

131 Product tax law IX-720: nickel-cadmium (8507.30), nickel-iron (8507.40),lead-acid (8507.10, 8507.20), Primary cells (8506.30)

LUXEMBOURG

Key points

- The 1994 Waste Management and Prevention Law, which has subsequently been replaced by the 2012 Waste Management and Prevention Law made local authorities responsible for separately collecting the new waste category of 'problematic wastes' needing special treatment. This category included batteries and accumulators. The 2008 Law on Batteries and Waste Batteries, transposing Batteries Directive 2006/66/EC, required the existing public collection of batteries through the SuperDrecksKëscht programme to be preserved while now requiring producers to fund the system. Producer controlled battery system Ecobatterien, established in 2009, thus replaced municipalities as the contracting party to the agreements with the private waste collection companies that operate the SuperDrecksKëscht programme.

- Ecobatterien data show a collection rate of **64% in 2013 and 68% in 2014. Since 2012, POM has decreased from 360g to 320 g per capita. The comparatively low POM level is likely due to a significant amount of batteries being purchased by Luxembourg residents in neighbouring countries.** The coverage of all types of hazardous or problematic wastes under the SuperDrecksKëscht programme improve visibility and create synergies in collection infrastructure.

Regulatory parameters for compliance organisations

Overview

The **1994 Waste Management and Prevention Law** introduced a household waste category for 'problematic refuse' needing special treatment, which included batteries and accumulators. Local public authorities were made responsible for the management of 'problematic wastes' arising from households and the private sector, as long as quantities generated by the latter are comparable to those of households. The **2008 Law on Batteries and Waste Batteries**, in force from 26 September 2009, preserved the existing battery collection infrastructure and, by amending the Waste Prevention and Management Law, makes the Customs Authority responsible for enforcement. The Batteries Law was initially drafted as a Regulation (in July 2007) but the State Council found that a regulation provided an insufficient legal basis for effective enforcement measures. A 2012 amendment to the Waste Act transposing Waste Framework Directive 2008/98/EC also revised producer registration and reporting procedures of the Batteries Law and clarified that battery collection points are not subject to authorization.

Roles and responsibilities in waste portable battery collection

- From 2010, **producers** are responsible for financing net costs of collection, treatment and recycling, and public information campaigns. The Batteries law requires that the existing **public collection infrastructure** (under the SuperDrecksKëscht programme) must be used. However, producers may set up alternative or complementary collection systems as long as they guarantee the same geographical coverage and collection frequency as the existing public infrastructure. The Minister may order producers to use the public system if collection falls below pre-regulation level.

- All **retailers and distributors** must take back batteries free of charge and can hand them over to public collection points.

- The **collection targets** are as per Directive 2006/66/EC (25% by 26 September 2012, 45% by 26 September 2016). The party responsible for achieving them is not defined.

Requirements on systems

Collective systems must be approved by the Ministry of Environment for a maximum of 5 years. They must have the sole purpose of assuming producers' obligations, be open to all producers and present annual financial accounts & budgets to the Ministry.

The conditions for **individual systems** are identical to those for collective systems: Producers must provide information as required in a waste plan and report annually to the Ministry on implementation progress. An individual system must In addition guarantee the same geographical coverage and the same frequency of collection as a collective system.

Development of compliance systems

Producer system Ecobatterien finances collection operations carried out under the **SuperDrecksKëscht fir Biirger** (Super Bins for Citizens) battery collection programme.

- Launched as a pilot project for the collection of 'problematic' (usually hazardous) household waste in 1985, **SuperDrecksKëscht** has expanded in parallel to the growing list of household wastes classified as problematic and operates Luxembourg's waste battery collection from private households . SuperDrecksKëscht activities also include advising and training local authorities and companies (SuperDrecksKëscht fir Betriber), creating consumer awareness and financing waste management projects.

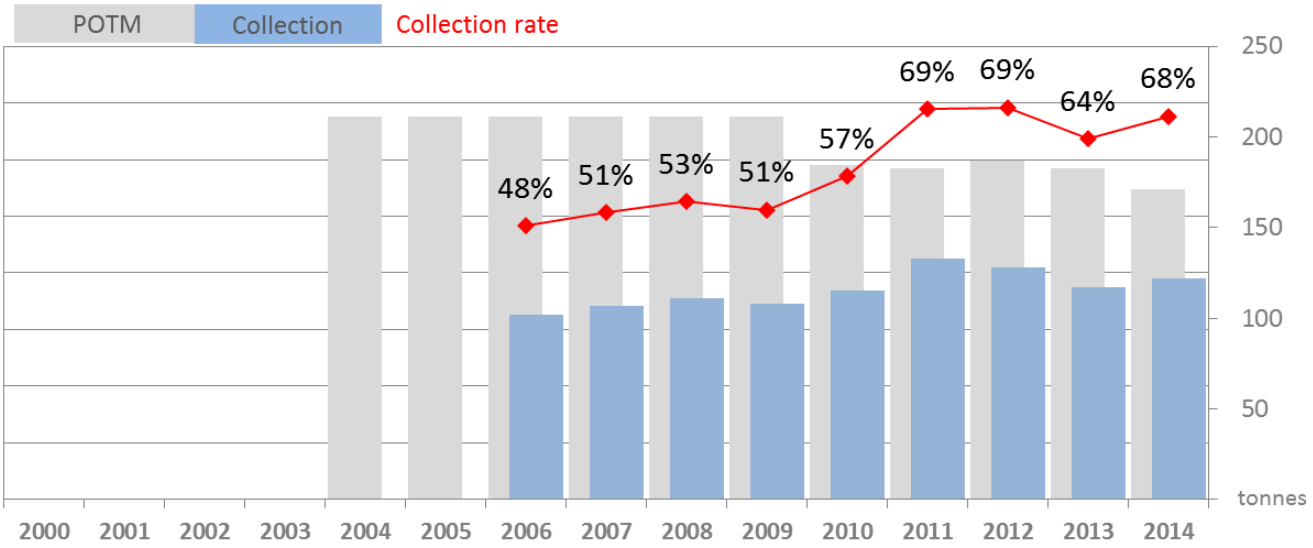
- **Ecobatterien** was set up as a not-for-profit organisation in October 2009 by Ecotrel, the collective WEEE system, and three business associations (Luxembourg Trade Confederation, the Federation of Craftsmen and the Business Federation of Luxembourg). It has about 500 members**.** Ecobatterien also covers industrial and vehicle batteries. Around 40 producers of B2B EEE with integrated portable batteries have approved individual take-back systems for batteries in place.

Interface with WEEE systems

Ecobatterien shares office staff and space with the Ecotrel collective WEEE system. Ecotrel was set up by 43 members of the Confederation of Commerce and the Federation of Craftsmen as a not-for-profit organisation in 2004.

Collection results

Since 2006, a collection rate of over 48% has been achieved. Ecobatterien data show a collection rate of **64% in 2013 and 68% in 2014. Since 2012, POM has decreased 360g to 320 g per capita. The comparatively low POM level (DE 541 g, NL 458 g, BE 378 g, FR 459 g) is likely due to a significant amount of batteries being purchased by Luxembourg residents in neighbouring countries.**



Source: From 2010 Ecobatterien

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 640 portable battery collection points in Luxembourg, or one per 800 residents (including points at retailers).

Over 40% of waste batteries are collected at municipal collection sites[132] for 'problematic substances' and 15% during mobile collections which take place three times a year in each communal district. Number of collection points and share of collected batteries, estimate 2012:

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers serviced by systems	250	8%
Municipal collection points	20	43%
Schools	150	4%
Companies	100	25%
WEEE dismantlers	1	5%
Other – mobile coll. 3 times p.a.	115	15%

Source: Based on data from Ecobatterien

[132] Operated by a number of private companies including Lamesch (Bettembourg), Horsch Entsorgung GmbH (Luxembourg), Espaclux s.a. (Koerich) offers collection, transport and recovery or disposal of all kinds of household and industrial wastes, Nouveaux Etablissements Liébaert and Polygone Ltd.

Awareness creation measures

Ecobatterien / SuperDrecksKëscht

The coverage of all types of hazardous or problematic wastes under the SuperDrecksKëscht programme improves visibility and create synergies in collection infrastructure. A **directory** on its website shows return possibility for all types of wastes covered for professional as well as private users.

- **Collection:** Images below show a municipal collection sites for 'problematic substances', and mobile collections from communal districts (an initiative launched in 2003 in cooperation with various business organisations[133]). Small collection boxes are distributed to shops and petrol stations, while for larger quantities about 250 30-litre PE drums have been installed in highly frequented areas in supermarkets, DIY stores and schools.



- SuperDrecksKëscht organises various **educational campaigns**. Worthy of special note is '**Clever Akafen**' (clever shopping) which promotes the purchase of rechargeable batteries for several applications to reduce the amount of waste batteries.

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM: The Batteries Law does not stipulate that POM reporting must be broken down into chemistries. However, Ecobatterien uses the Batbase reporting software which allows reporting by chemistry and can automatically add battery weights if a producer specifies the battery classification, which prevents weighing errors by individual producers.

In its first year (2009) Ecobatterien published a list of the average number and types of batteries contained in EEE to simplify reporting for producers, which in Luxembourg are almost exclusively importers with limited resources or access to master data. Subsequently, producers had to declare the actual weight of batteries included in EEE. POM volumes are audited.

In September 2014, Ecobatterien's General Assembly decided to simplify fees and clarify battery categories. Notably, a weight threshold of 3 kg for portable batteries (with exception embedded lead batteries) was introduced from 1 January 2015. More specifically,

- all batteries with a weight of 3 kg or below must be reported as portable batteries, including batteries of e-bikes;
- lead acid batteries with a weight of over 3 kg that are included in appliances - but not in vehicles with 4 wheels - may be reported as portable batteries (e.g. a 3.5 kg e-bike battery would classify as portable);
- all other batteries (with a weight of over 3 kg) must be reported as industrial batteries including those used in e- and hybrid vehicles with 4 wheels or more, unless they are automotive starter batteries.

The detailed breakdown of 2015 reporting categories can be viewed **here**. There have been considerations to replace the Batbase system with less detailed reporting system but for the time being Batbase remains in use.

[133] Chamber of Commerce, the Federation of Craftsman and the Federation of retailers

From the 1st of January 2015, the lists of batteries and accumulators and the recycling fees will be adapted.

The Customs Authority and the Administration of the Environment are jointly responsible for enforcement. Enforcement actions have been carried out against free-riders.

Collection: Ecobatterien records collected volumes by chemistry, primary/secondary and other criteria. To avoid ambiguities, all waste batteries under 2 kg are recorded as portable batteries, and those above 2 kg as industrial or automotive batteries. The threshold was changed to 3 kg with effect from 2015. In September 2014, Ecobatterien simplified and clarified battery classifications: Notably, a weight threshold of 3 kg for portable batteries was introduced from 1 January 2015. All batteries with a weight of 3 kg or below must be reported as portable batteries, including batteries of e-bikes.

Potential for improving collection rates

The system could be further optimised by clearer requirements on retailers to increase the density of collection points and on collectors to improve the ability to monitor waste battery material flows.

MALTA

Key points

- Since September 2004 **the Eco-Contribution Act** has applied an eco-contribution to batteries, but not to batteries integrated into EEE. **Regulations of 2008** provide for exemptions from the tax for members of an approved battery organisation but have not yet come into force. **Regulations** transposing Batteries Directive 2006/66/EC came into force in May 2010. However, no battery organisations have been approved yet. Since 2003, Government controlled and financed **WasteServ** has organised the separate collection of portable batteries. The Government's 2015 budget foresaw the elimination of the eco-contribution on EEE and *possibly* batteries from September 2015. **However, legislation published in August 2015 retains the eco-contribution on batteries (while removing it from EEE).**

- According to MEPA data, a portable battery collection rate of 20% was achieved in 2012, increasing to 41% in 2013, **but falling to 21% as collection decreased by -84% while POM increased by 19% over 2013.**

- Due to its island status and small population, Malta faces challenges that are different from other countries regarding producer responsibility implementation. Most notably, the low volumes of the different waste streams would hardly justify the overheads that a separate producer responsibility organisation for each waste stream would incur, let alone competing organisations. The continuing impossibility of fulfilling the requirements under the producer responsibility regulations (both for batteries and WEEE) and the legal uncertainty that this entails could be ended by a clear decision either for an improved eco-taxation model only or an EPR model that provides for realistic exemptions from the tax. However, it remains unclear to what extent the Government truly wishes to involve producers of WEEE and batteries in waste management. While it reiterates that it does not intend *'to use WasteServ as a barrier to private enterprise involvement in waste management services … but to act as an operator of last resort [for services the private sector does not provide]'*[134], a clear schedule for exempting producers of WEEE and batteries from the eco-contribution has yet to appear.

Regulatory parameters

Overview

The **2002 Batteries and Accumulators Regulations** required entities producing or importing batteries to be licensed. In January 2003, the Government established WasteServ Malta Ltd to operate waste management organisations for all waste streams, including batteries. Since September 2004 **the Eco-Contribution Act** has applied an eco-contribution to primary batteries (currently EUR 0.06 per unit) and accumulators (below 35 g EUR 0.06 per unit, above EUR 1.63). The eco-contribution is charged by customs code[135] and does not apply to batteries integrated into EEE.

Regulations of February 2008 that provide for exemptions from the tax for members of an approved battery scheme have not yet come into force. The **Waste Management (Waste Batteries and Accumulators) Regulations** transposing the Directive's producer responsibility provisions[136] which entered into force on 30 May 2010, apply independently of the eco-contribution to all batteries, whether integrated into EEE or imported separately. Registration of producers has yet to commence. Malta's 2014-2020 Waste Management Plan proposed - and the Government's 2015 budget foresees - the elimination of the eco-contribution on EEE and possibly batteries from September 2015. **However, the August 2015 amendment to the Eco-Contribution Act maintaining the eco-contribution on batteries.**

134 A Solid Waste Management Strategy For The Maltese Islands, December 2010

135 HS Code numbers 8506 (exemptions for batteries for hearing aids, cochlear implants and cardiac pacemakers) and 8507

136 A Legal Notice of October 2007 transposed the labelling and the substance limitations of Directive 2006/66/EC

Roles and responsibilities in waste portable battery collection

- From 30 May 2010, **producers** or third parties acting on their behalf should have financed the management of waste batteries by using existing collection organisations or setting up new ones. Small producers may be exempted from the financing obligation.

- **Collection organisations** are subject to permit requirements. They may be run in conjunction with WEEE organisations. Organisations must not only allow all economic operators to participate (as required by the Directive) but also all competent public authorities. Organisations must be designed to avoid barriers to trade or distortions of competition.

- **Retailers** must take back spent batteries free of charge when supplying new batteries.

- **Municipalities** have no obligations with regard to waste batteries.

- **Collection targets** increase annually by 5%, from 25% in 2012 to 45% in 2016 (but shall be calculated for the first time for the fifth full calendar year after entry into force of the Regulations (2016). The responsibility for reaching the collection target is not defined.

Requirements on compliance organisations

Collection organisations must be approved by the Malta Environment and Planning Authority (MEPA). Organisations shall enable end-users to discard waste batteries free of charge at accessible collection points [which are not themselves subject to registration or permit requirements]. Organisations may be run in conjunction with WEEE organisations and must be designed to avoid barriers to trade or distortions of competition. Notably, a organisation must allow the participation of competent public authorities. There are no requirements regarding legal form or ownership of a organisation.

An **individual organisation** must be approved by MEPA. Approvals must specify enforceable implementation details and be published in the Official Gazette.

Development of compliance organisations

In 1994, a battery collection service was introduced by the Waste Management Strategy Implementation Department (WMSID) of the Ministry for Resources and Infrastructure (which has been reorganised into the current Ministry of Environment). Special bins were provided (on request) by the Department to retail outlets for customers to dispose of their used batteries.

Since 2003, Government controlled and financed **WasteServ** has organised the separate collection of portable batteries, financed by the Government in part with revenue from the eco-contribution.

The non-implementation of the Batteries Regulation 2010 should be seen in the context of the experience of the earlier (2007) WEEE Regulations: while two WEEE organisations were licensed in 2008, their members were never granted an exemption from the eco-contribution on EEE, and at the end of 2009 the last licence expired. While the Government reasoned that the expiry was due to the organisations' (and therefore producers') failure to start operations, producers argued that the exemption should precede operations in order to avoid being charged twice (i.e. fees for the organisation and the eco -contribution).

In the light of this stalemate, the Batteries Regulation was not received with much enthusiasm in 2010, though the two packaging schemes, GreenPak and Green MT, indicated some interest.

It remains unclear to what extent the Government wishes to involve producers of WEEE and batteries in waste management. The government reiterated that it does not intend 'to use WasteServ as a barrier to private enterprise involvement in waste management services … but to act as an operator of last resort [for services the private sector does not provide]'[137].

Producers, for their part, see such an exemption as a pre-condition to starting collection operations as otherwise they would be paying double for the waste management of their products.

Interface with WEEE organisations

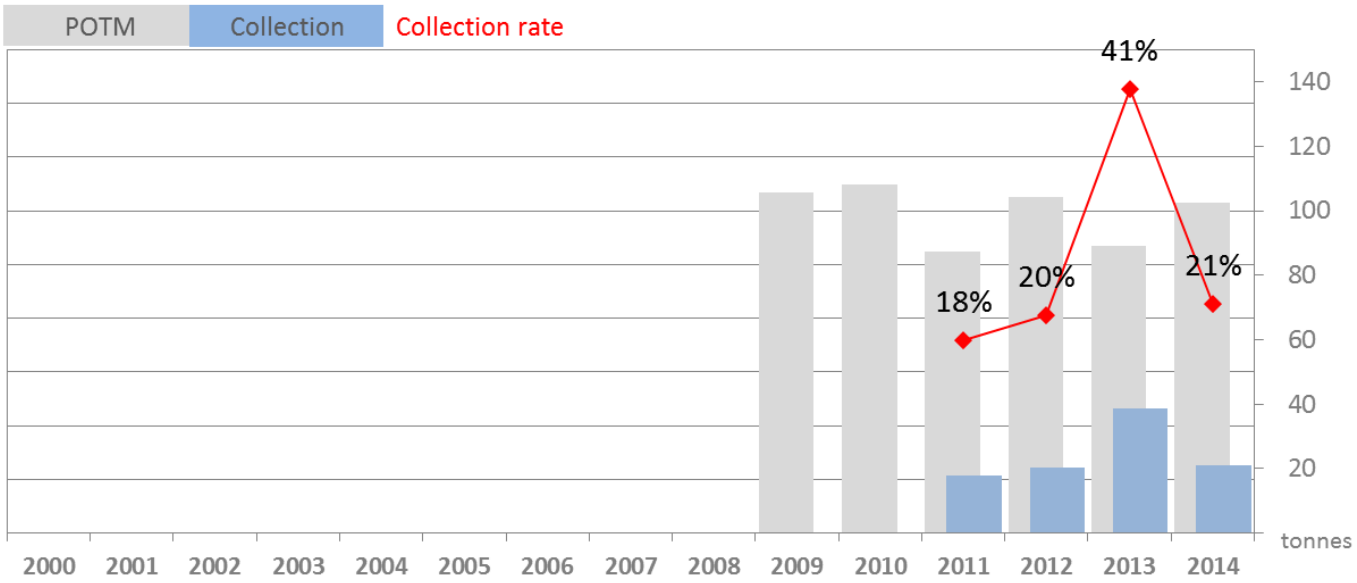
There are currently no approved WEEE organisations in Malta.

Collection results

According to MEPA data, a portable battery collection rate of 20% was achieved in 2012, increasing to 41% in 2013, **but falling to 21% as collection decreased by -84% while POM increased by 19% over 2013.**

On a per capita basis, POM of portable batteries in Malta has been low (2012: 250; 2013: 210 g; **2014: 240g) but has now exceeded Cyprus (2011/2014: CY: 276/226g; IT: 487/397g).**

Data provided by MEPA show around 50 g of waste portable batteries collected. Data from the National Statistics Office show that civic amenities sites *alone* collected 38 g per capita of batteries in 2009, 88 g in 2010 and 45 g in 2011. However, these volumes may contain not only portable batteries.



Source: MEPA

[137] A Solid Waste Management Strategy For The Maltese Islands, December 2010

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 900 waste portable battery collection points in Malta, or one for every 480 residents.

WasteServ's schools programme is responsible for about half of all collected batteries. Retailers that collect batteries typically return them to a WasteServ municipal collection centre.

Number of collection points and share of collected batteries, estimate 2011:

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers	724	0%
Municipalities	5	10%
Schools	146	50%
Companies		40%
WEEE dismantlers	4	0.02%

Source: MEPA

Awareness creation

WasteServ

- **Collection containers:** Batteries are collected under WasteServ's programme for domestic hazardous waste. WasteServ has distributed waste battery containers to local councils, schools, shops etc. from which batteries are regularly collected, sorted and stored for export. Waste batteries can also be taken directly to Civic Amenity sites.

- **Campaigns:** In 2009, WasteServ launched the 'Battery Busters' campaign to create awareness of waste battery collection. The campaign, run each scholastic year from January to March, is essentially a competition between schools with the winner being the school collecting the largest amount of batteries. A draw among participants is also organised to incentivise school children to participate. The 2010 campaign resulted in 9 tonnes of used batteries being collected (2009: 5.2 tonnes). The campaign is fronted by **Batterina**, a female battery-collecting robot, and sponsored by FIMBank.

2015:

Accuracy of reporting

POM: Scope and reporting requirements of the Eco-contribution (only separately sold batteries, per unit basis) and producer responsibility legislation (all batteries, on weight basis) are not aligned. Under the latter, producer registration and reporting obligations apply independently of whether or not a battery or EEE is subject to the Eco-contribution. **POM** reports must distinguish between chemistries and primary/secondary batteries.

Authorities can assess **collection** volumes by adding collection of WasteServ and other battery collectors and exporters.

Potential for improving collection rates

Due to its island status and small population, Malta faces challenges different from other countries regarding producer responsibility implementation. Most notably, the low volumes of the different waste streams would hardly justify the overheads that a separate producer responsibility organisation for each waste stream incurs, let alone competing organisations.

The continuing impossibility of fulfilling the requirements under the producer responsibility regulations (both for batteries and WEEE) and the legal uncertainty that this entails could be ended by a clear decision for an improved eco-taxation model only or an EPR model that provides for realistic exemptions from the tax.

NETHERLANDS

Key points

- A **Government Decision of 1995** held producers of batteries weighing 1kg or less responsible for collecting 90% of waste batteries by 1999 through approved waste plan(s). In mid-1995 the Battery Foundation (Stichting Batterijen, or Stibat) set up a collective organisation to take back waste batteries. In 2008, a **Batteries Regulation** transposed Directive 2006/66/EC and obliged retailers to take back batteries, and producers to reach the 25% collection target in 2012.

- From 2010 to 2013, the collection rate increased from 41 to 43% as collection and POM declined steadily. **In 2014, both downward trends reversed, with POM increasing by 12% and collection by 3%. The collection rate reached close to 44.6%,** despite extensive communication over many years, which illustrates the challenge of reaching the 45% collection target.

Regulatory parameters

Overview

In 1988 the Dutch Government's **Memorandum on the Prevention and Recycling of Waste** set a target of separately collecting 100% of batteries by 2000. Industry explained in its **1992 Batteries Implementation Plan** how it planned to achieve this target, using the existing local authority collection infrastructure, while the government maintained pressure by threatening a deposit organisation on batteries.

The Government's **Batteries Recovery Decision of 1995** held manufacturers and importers of batteries weighing 1kg or less responsible for collecting 80% of waste batteries by 1996 and 90% by 1999 through approved waste plan(s). If these targets were not achieved, batteries would be subject to a mandatory deposit organisation. In 1995, the Government agreed to industry's implementation plan, to be put into effect through the Batteries Foundation (Stibat). Although the targets were not met, the deposit organisation was not activated and the 2003 Stibat approval called for a collection rate of 80% in 2008, now based on waste batteries 'available for collection'[138].

In 2008, a new **Batteries Regulation** and several Decisions transposed Directive 2006/66/EC. The Regulation required all retailers to take back batteries and held producers responsible for achieving the 25% collection target in 2012. In May 2009, battery organisation Stibat's waste plan under the new legislation was approved.

[138] The sum of waste batteries collected and waste batteries disposed of in general household waste as arrived at by sampling. Waste batteries 'arising' were assumed to be under 50% of POM, suggesting over half of expired batteries were being hoarded by end- users.

	2002	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***
Waste batteries arising (tonnes)	2,849	2,852	3,139	3,281	3,435	3,494	3,587
% of batteries POM	47%	40%	41%	41%	42%	42%	41%

Source: Stibat Annual Report 2008

Roles and responsibilities in waste portable battery collection

- **Producers** to put in place a collection scheme, either individually or collectively, and be responsible for consumer awareness measures. In practice, they must comply through collective organisation Stibat and are free to show Stibat's fees on their invoices[139].
- Producers may contract **municipalities**, who are not obligated to collect.
- Since 2009, **retailers** have had to take back batteries free of charge and may return them to wholesalers. There are no de minimis exemptions.
- Approved **collective organisations** will assume the obligations of their producer members and must take back waste batteries from municipalities and through their own collection networks.
- **Individual organisations** are subject to the same requirements as collective organisations.

Requirements on compliance organisations

Producers must have a waste plan approved by Environment Agency Agentschap NL (formerly SenterNovem) which applies for an indefinite period of time. The waste plan for an individual or collective organisation must include details of

- measures taken to ensure compliance with the 'prohibitions' (restricted substances) and the labelling obligations
- the financing model
- measures taken to ensure take-back if a producer ceases to put batteries on the market
- the measuring and monitoring organisation.

Development of compliance organisations

The Battery Foundation (Stichting Batterijen, or **Stibat**) remains the only collective organisation for portable batteries. Stibat also manages industrial batteries. For automotive batteries it cooperates with organisation Auto Recycling Netherlands (**ARN**).

All producers of portable batteries comply through the Stibat plan. A few producers of industrial batteries comply through individual plans.

Interface with WEEE organisations

The collective WEEE organisations **NVMP** (now Wecycle) and **ICT Milieu** (now managed through Wecycle) were established after Stibat. They require their members that place EEE containing batteries on the market to join Stibat before they join a WEEE organisation.

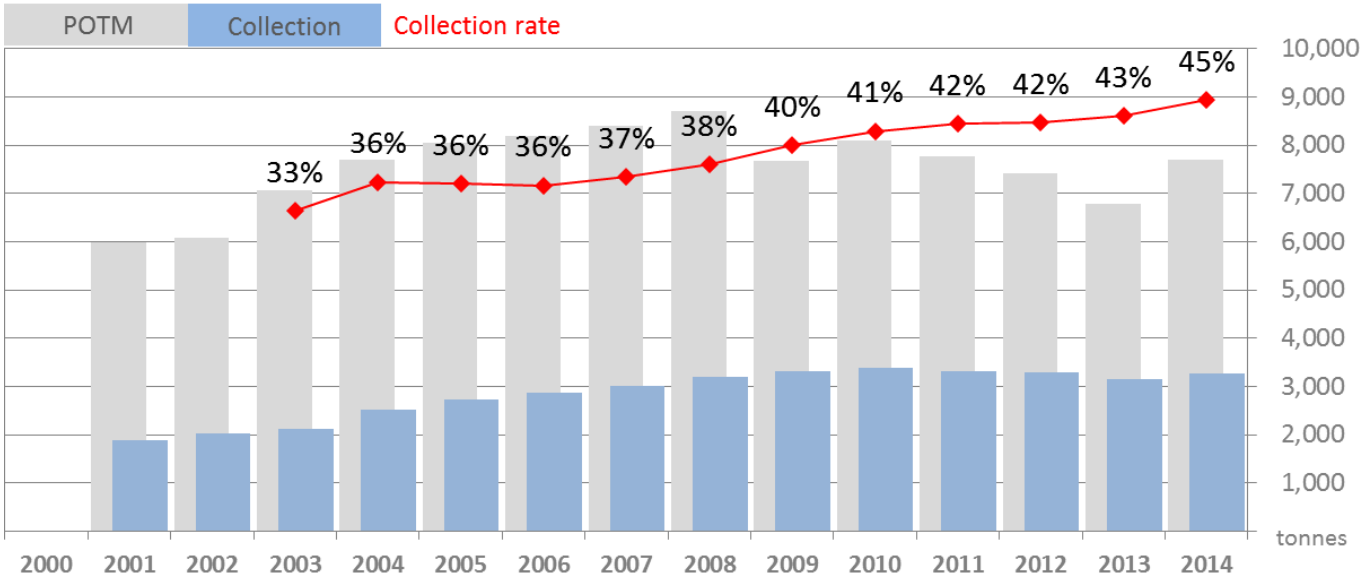
[139] Before 2009 Stibat's fees were shown on invoices

Collection results

From 2010 to 2013, the collection rate increased from 41 to 43% as collection and POM declined steadily (collection slower than POM). **In 2014, the downward trend reversed, with POM increasing by 12% and collection by 3%, and the collection rate reached 44.6%.**

In terms of weight, POM decreased from a peak of 530 g per capita in 2008 to 406 g in 2013 **and is back to 458 g in 2014. In terms of units, POM increased by 16% to 26 units per capita in 2014 (+16%) over 2013 (22 units).**

Stibat estimates that its collection rate of 42% in 2011 corresponded to 85% of waste batteries available for collection[138].



Source: Stibat

Drivers affecting the collection rate

Availability of collection points and use of collection channels

In 2011, there were about 22,000 **(2014: over 29,000)** waste portable battery collection points in the Netherlands, or one per 750 **(2014: 540)** residents, serviced by a free pick-up service. This figure is based on the number of collection points at retailers and schools, operated by Stibat, and excludes collection points at municipal container parks.

Retailers 30-33%: Stibat provides collection boxes to around **23,900** retail outlets, up from around 11,000 in 2007 and 17,300 in 2012). This strong increase followed the 2008 Regulations that made retailers responsible for taking back waste batteries from September 2008[140]. **While the number of Stibat retail collection point increased almost 40% from 2012 to 2014, the volume of waste batteries returned from retailers increased only slightly (+3% in 2014), suggesting diminishing marginal returns from additional collection points.**

Schools 5-6%: In 2012, 4,800 out of about 5,000 primary schools are serviced by Stibat, not least due to the attractive incentive campaigns and educational activities aimed at this group. They contributed 5% of all waste batteries collected. In 2013 essentially all primary schools participated but their share of collected batteries fell to 4%.

Waste collectors 60%: Waste firms operating the Municipal Small Chemical Waste (KCA) Organisation on behalf of municipalities collect waste batteries in 'bring' containers and small chemical waste boxes. Retailers may also transport collected batteries to the KCA depots free of charge[141]. Municipal collection sites contribute an estimated 45% of all collected waste batteries. These batteries are all delivered to the central warehouse and sorting centre in Lelystad contracted by Stibat. While Stibat does not finance the KCA collection, its financing begins from the KCA organisation onwards and includes undertaking promotional activities to encourage consumers to return spent batteries.

Number of collection points and share of collected batteries, estimate **2014**:

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers	**23,907** (2013: 17,049; 2012: 17,200)	**33%** (2013: 32%; 2012: 29%)
Municipalities		45%*
Schools	**4,999** (2013: 5,067; 2012: 4,800)	**4%** (2013: 4%; 2012: 5%)
Companies		18%*
WEEE dismantlers	3 (3)	Included in companies
Other	**1,425**	**1%**

** Waste collection companies service municipalities' KCA organisations and commercial end-users. Both sources combined contributed 66% and 64% in 2012 and 2013 respectively.*

Source: Own estimate based on data from Stibat reports

Consumer awareness creation

For nearly 15 years Stibat has continuously implemented well planned and extensive collection and communication strategies. As a result, the collection rate steadily increased over the years to 42% but has remained at that level for several years now. Probably better than any other country, the Dutch experience thus illustrates the challenge of achieving the 45% collection target.

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140 On this basis, Stibat signed agreement with retail associations RND, which represents the majority of the retailers in the Netherlands and UNETO-VNI, which has 5,500 electrical installation firms and retailers as members. Of all batteries collected by retailers in 2011, 55% originated from food retailers, 15% from telecoms shops, 11% from EEE retailers and 10% from other non-food retail. Drugstores and filling stations contributed only 2% and 1%, respectively

141 Note: The 1995 Batteries Recovery Decision required that, for all batteries outside the scope of Batteries Directive 91/157/EC, the KCA (small chemical waste) logo should be shown on the packaging or on leaflets if incorporated into appliances. [Checks in 1999 revealed a compliance rate of 80% and led to fines.]

Stibat's communication strategy has shifted away from TV and radio towards more effective internet and social media: From 2007, Stibat cut communication costs to 40% of previous years, as TV and print commercials were used only sporadically. In 2008 only radio commercials and online media were deployed. Key communication elements:

- **Win Campaign** prize draw for each returned collection bag, supported by a viral campaign: The '**Empty Batteries – Hand them in and win'** campaign allows end-users returning at least 10 batteries in a collection bag with their name and address on it to participate in a draw. Each month 51 winners are drawn. The first prize is EUR 2,000 in travel vouchers, with other prizes worth about EUR 50. Users visiting the campaign site are encouraged to send the link to friends. The campaign continues the viral email campaign 'tell a friend' which included the same draw mechanism, and collected about 350,000 email addresses annually. The number of bags returned increased from 1.8 million in 2006 to more than 2.2 million in 2010.

- **Campaign aimed at primary school children:** To inform children about the usefulness and necessity of recycling batteries, Stibat's **Batteryworld** provides information, teaching materials and educational games for primary school students. Moreover, for each kilo of waste batteries collected, a school earns points that can be exchanged for toys, skipping ropes, scooters, computer games, DVD players and musical instruments. The incentive package below also applies to schools. **In early 2015 a 'webshop' was developed where schools can redeem points and order prizes.**

- **Social media:** Stibats' **Facebook page** provides more information on additional competitions and notifies the winners. Educational videos on YouTube provide information on the hazardous nature of batteries and how and why they should be recycled.

- **Collection boxes and return stations:** In February 2012 Stibat started a pilot together with WEEE organisation Wecycle for the combined collection of batteries and low-energy light bulbs (mainly in Food retail) and small electrical appliances[142] (mainly in D-I-Y retail). This project will be evaluated during 2013.

- **Fairs and events:** **Stibat participates periodically in various fairs, festivals and events. In 2014 Stibat held positions at the Home Exhibition, Libelle Summer Week, the Margriet Winter Fair, Valtifest and 50PlusBeurs.**

[142] Stibat stopped supporting another joint programme, Jekko (which distributed collection boxes to be used in households for small devices, batteries, light bulbs and printer cartridges) as it did not increase battery collection volumes but cannibalised other battery collection channels while having higher costs then these channels.

Consumer awareness and disposal behaviour

Stibat surveys show that while over 90% of respondents consider battery disposal very important, only 75% claim to always or mostly return batteries to proper disposal channels. The number has declined from a peak of 80% in 2007/8.

% of respondents	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
battery disposal very important	90	92	92	92	93	91
Always/mostly return batteries	78	80	80	79	80	75

A 2012 Stibat study estimated that the average household 'stored' 23 waste batteries (170 million on a national basis) in old and discarded EEE or stashed away in drawers.

Accuracy of reporting

POM reports: The 2008 Batteries regulation requires Stibat members to report the weight and chemical composition of batteries, which is done through the web-based reporting platform **myBatbase**. The organisation was developed by Belgian battery organisation Bebat and contains a library of all known batteries. Members only need to select the battery placed on the market, thus avoiding errors that can arise when reporting on weight and chemical composition. Batteries weighing more than 3 kg are considered industrial batteries.

Audits: Before 2009, members whose annual contribution exceeded EUR 11,000 (excl. VAT) had to submit an audit by an independent third party. Since 2009, any Stibat member may be subject to an audit. Stibat selects 40 to 50 members annually based on size or suspected reporting errors.

Free-riders: Suspected free-riders are contacted by Stibat with a copy to the Inspection. VROM (now Ministry of Infrastructure and Environment) explained in 2008 that it chose a 'waste plan' requirement rather than registering individual producers because registration (with a national register) would result in more **free-riders**, while waste plans are mostly fulfilled collectively and companies provide a control for each other.

Collection reports: Collection can be tightly monitored as waste batteries are usually sorted in Stibat's contracted sorting centre in Lelystad. The total collection volume is the sum of these sorted batteries plus an additional 2-3% of waste batteries reported from battery recyclers in Europe receiving waste batteries directly from Dutch companies that bypass Stibat.

Stibat does not publicly disclose collection results broken down into chemistries.

NORWAY

Key points

- Since July 2000, **Regulations on Waste Recycling** have imposed take-back and reporting obligations on producers of lead-acid, industrial nickel cadmium and rechargeable batteries only. An **amendment of October 2012** transposed the producer responsibility provisions of Directive 2006/66/EC. The transposition notably distinguishes between compliance options and requirements for separately sold batteries and batteries integrated into EEE.

- Since 1999, **Rebatt AS** has been the only collective organisation for separately sold portable batteries. It shares its management with and operates collection under the name of **Batteriretur,** which has been the organisation for automotive lead-acid batteries since 1993. **Producers of batteries integrated into EEE** comply through one of five competing WEEE organisations.

- As regards POM and collection of **separately sold batteries**, Batteriretur's collection data show a collection rate of 26% in 2011, 38% in 2012 **and 39% in 2013 and 2014, as POM increased at about the same rate as collection volumes in these years.** The collection rate is subject to significant uncertainties about **batteries in EEE**. We estimate for the **overall portable battery collection rate** wass 26% in 2012**, increasing to 30% in 2014. However, these rates may not include a substantial amount of batteries removed from WEEE during treatment.**

- Tighter enforcement of the retailers' take-back obligations could help to increase the density of collection points at retailers which we assume remains quite low. Waste reporting could be improved by obligating treatment facilities to report batteries received to authorities.

Regulatory parameters

Overview

As a signatory to the EEA agreement, Norway is required to transpose EU waste legislation. **Product regulations of 1990** applied only to batteries containing hazardous substances and were amended in October 2012 to transpose the single market requirements of Directive 2006/66/EC.

Since July 2000, **Regulations on Waste Recycling** have imposed take-back and reporting obligations on producers only for lead-acid, industrial nickel cadmium and rechargeable batteries. An **amendment of October 2012** transposed the producer responsibility provisions of Directive 2006/66/EC. The amendment includes an extension of the take-back obligations to all waste batteries, and sets a collection target of 30% for separately sold portable batteries placed on the market in the previous year. A further amendment in November 2013 tightened the reporting requirements for recycling companies. **In 2015 several amendments were made to hazardous waste legislation. Notably, households and small businesses may deposit up to 1,000 kg (up from 400kg) per year for free at hazardous waste collection sites from 2016.**

Roles and responsibilities in waste portable battery collection

- **Producers of separately sold batteries** must comply through a battery compliance organisation approved by Environment Agency, Miljødirektoratet (MD) (formerly KLIF) [there is no provision for individual compliance].

- Approved **waste battery organisations** must ensure the establishment of a [nationwide[143]] take-back organisation. They must take back waste batteries collected by retailers free of charge and inform end-users i.a. about free return options.

[143] In all areas into which members sell batteries

- An approved organisation must achieve a **collection target** of 30% of the weight of batteries its members put on the market in the previous year [no annual increase as KLIF (now MD) argues that it would like to see actual collection rates before setting a higher target].

- **Retailers** must take back batteries of the types they sell free of charge. They are not obligated to return collected batteries to organisations.

- **Local authorities** are not required to provide separate waste battery collection.

- **Producers of batteries integrated into EEE** that are members of an approved WEEE organisation do not need to join an approved waste battery organisation. Approved **WEEE organisations** must ensure removal of waste batteries from WEEE. They are not subject to a collection target for batteries.

Requirements on compliance organisations

Approval requirements for all producer responsibility organisations are comparatively light and authorities' intervention capacity limited. For example, there are no requirements regarding their ownership, legal form, profit objective or financial disclosure.

Waste batteries organisations (**'return companies')** must be approved by KLIF (now MD). They must demonstrate that they can fulfil the requirements of the regulations (collection coverage, allowing all producers and importers to participate on equal terms, etc.). Mandatory reporting is limited to POM and collection-related data such as volumes and further processing.

Approved **WEEE organisations** are subject to the same battery *reporting* obligations to KLIF (now MD) as waste battery organisations.

Development of compliance organisations

The only collective organisation approved for portable batteries is **Rebatt AS**, which shares its management with AS **Batteriretur.** Both operate under the Batteriretur name. Rebatt was set up in 1999 by large retailers affected by the waste batteries take-back obligation. Batteriretur AS was set up in 1993 to assume producer responsibility obligations for automotive lead-acid batteries, and in 1997 it also started collecting Ni-Cd batteries.

Around 4,700 producers of **EEE with integrated batteries** comply through five approved WEEE organisations: Elretur (B2C EEE); Renas (B2B EEE) and, since 2011, ERP Norway, Elsirk (formerly Ragn-Sells Elektronikåtervinning) and Eurovironment. In late 2011, Elretur acquired Eurovironment from Veolia, which means that over 90% of WEEE collection is currently managed by producer-controlled organisations.

While MD has to operate the EEE producer register as there are multiple WEEE organisations, REBATT's position as the single battery organisation allowed MD to avoid the costs of operating a national register of battery producers.

Clearing for over- and under-collection/ interface with WEEE organisations

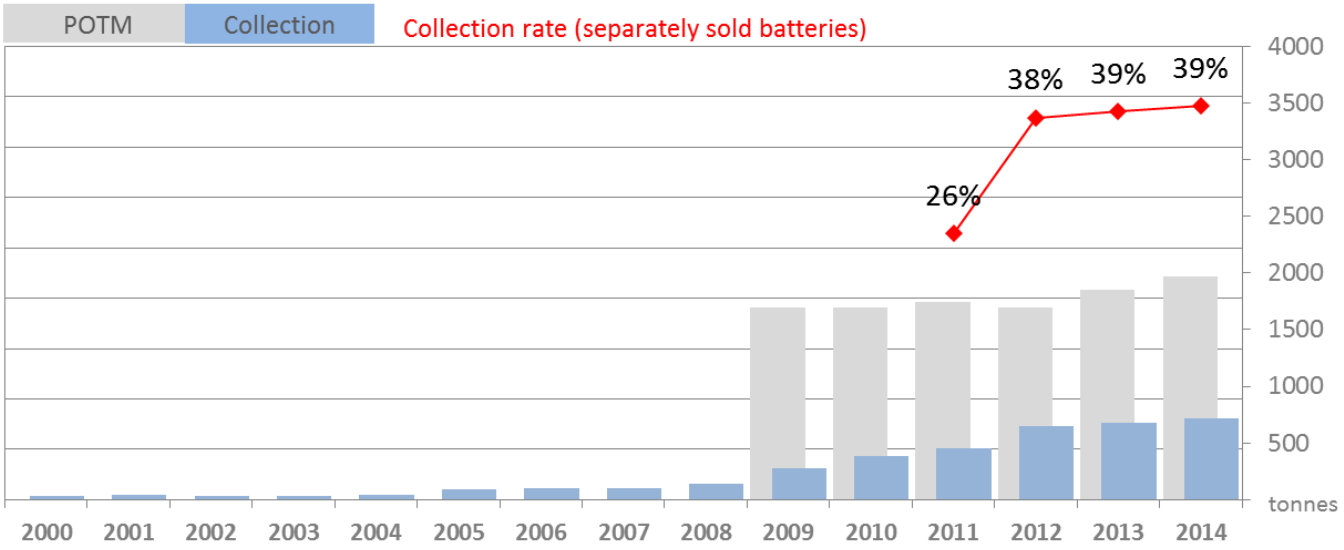
As EEE producers do not need to join and finance the approved battery organisation[144], the battery organisation and the WEEE organisations have distinct producer memberships. Moreover, WEEE organisations covering batteries integrated into EEE are not subject to battery collection targets. Thus, there is no need for an interface between the battery and WEEE organisations.

[144] Batteries that are placed on the market integrated into EEE are typically not disposed of in the portable batteries collection channel but together with WEEE.

Collection results

Collection rate of separately sold and collected batteries

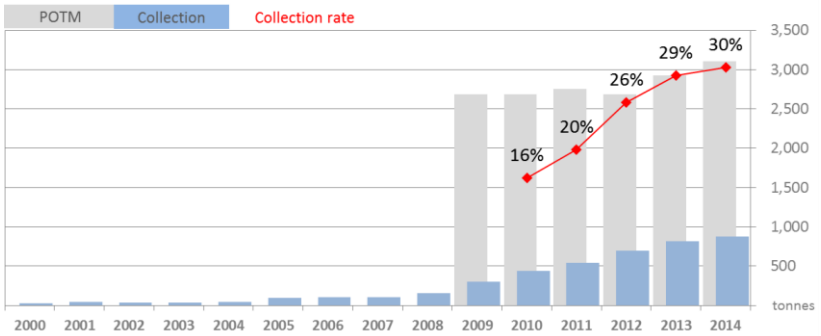
As regards POM and collection of **separately sold batteries**, Batteriretur's collection data show a collection rate of 26% in 2011, 38% in 2012 **and 39% in 2013 and 2014, as POM increased at about the same rate as collection volumes in these years.**



Source: Collection data: Batteriretur; POM estimates based on Batteriretur communication

Overall collection rate - estimate

The collection rate is subject to significant uncertainties about **volumes of batteries in EEE**. The legal requirements to report POM weights only came into force from October 2012. No separate POM data are available for 2013 **and 2014**. We estimate POM of batteries in EEE contributes 36% by weight to total portable battery POM. As regards the **collection of batteries in EEE**, we take into account volumes received by Batteriretur from WEEE treatment facilities. On this basis, we estimate for the **overall portable battery collection rate** is 26% in 2012**, increasing to 30% in 2014. However, these numbers may not include a substantial amount of batteries removed from WEEE during treatment[145].**



Source: Before 2012: Batteriretur, EE registeret KLIF (now MD)[146]; 2013/4: POM Batteriretur + estimates

145 We account only for those battery volumes that the WEEE organisations sent to Batteriretur. These do not correspond with WEEE Register EE-registeret's reports which show 23 material fractions (including batteries) of treated WEEE. We could not confirm if and under which classification these batteries are accounted for. 1) 'External batteries' are 'all batteries that can be removed from WEEE without special tools and internal batteries that are hazardous waste, except those that are mounted to printed circuit boards" and 2) Batteries other than those previously mentioned. In 2012, the first battery fraction amounted to 688 tonnes (up from 326 in 2008), the second battery faction came to 49 tonnes (up from 20 in 2006). The combined fractions make up around 0.6% of WEEE treated.

146 According to KLIF, in 2010 around 1,500 tonnes of separately sold portable batteries were placed on the market.

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 5,750 waste portable battery collection points in Norway, or one per 870 residents.

Number of collection points and share of collected batteries, estimate 2013 (2012):

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers serviced by organisations	5000	5%
Municipalities	428	13% (10%)
Schools	-	-
Companies	325 (300)	(80%)
WEEE dismantlers	10 (10)	32% (5%

Source: Sagis estimate based on partial data from organisations

Consumer awareness creation

Batteriretur

- **Collection boxes** can be ordered from Batteriretur by retailers, companies or institutions and returned by mail when full (postage paid by Batteriretur). The dark green collection box reminds users to keep rechargeable batteries separate. On the right, containers for larger volumes.

- **School collection competition:** The '**Battery hunt**' collection competition **is an annual event** organised by children's environmental organisation **Miljøagentene**, retailer **Clas Ohlson**, Varta Battery **and Elretur (Batteriretur)**, held for the first time in February and March 2013 for a duration of 5 weeks. Any 4th grade class in Norway can participate. The class achieving the highest *per student* collection weight wins prizes (in 2013: a laptop for each student in the class). The campaign allows only primary batteries to be collected[147]. Students can return collected batteries to Clas Ohlson outlets directly or via post (collection boxes included paid return postage). Classes can update the status of their collection volumes online, thus maintaining their interest for the duration of the competition. Competition materials consist of collection boxes for batteries and posters for the classroom.

147 AA, AAA, AAAA, C, D, 9V, 4.5V and button cell batteries

The winning class collected 114 kg of waste batteries per student, nearly 900 times the average per capita collection in 2012. The entire competition yielded over 48 tonnes (7.5% of the 2012 collection volume). **In 2015 the winning class collected 2.7 tonnes of waste batteries – about 152 kg per student. All participant collected about 80 tonnes in total. The competition is repeated annually.**

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM reporting integrated batteries: The legal requirement to report POM weights of all battery types only came into force in October 2012.

POM reporting of separately sold batteries: In line with several WEEE organisations in Norway, Rebatt's fees to producers are calculated on import and invoiced by the customs authority. This is not legally mandated but based on a service agreement with the authority. **Customs** and Excise tax authorities charge Rebatt members a single fee of around EUR 0.78 per unit on imported batteries under HS codes 85.06 (primary batteries) and 85.07 (accumulators). Non-members are charged around EUR 1 per kg. Customs also publish a list of Rebatt and Batteriretur members. As customs charge per unit, we assume that declared battery weights are often estimates, as customs officials and the importers' agents involved in the weight declarations may not know the accurate weight of the imported batteries.

Collection reporting: Only approved WEEE and battery organisations are required to report collection and treatment volumes. Batteriretur reports collection directly to the government's statistics office through IT organisation 'The Batteriregister' (licence from the control authorities, **Datatilsynet**). By contrast, collectors and treatment facilities themselves have no obligations to report and there are concerns about (valuable) waste batteries disappearing without being reported to the organisations. In this context, the soon to be available compliance organisation for industrial batteries will help in the monitoring of all battery flows.

42% of WEEE was exported for treatment in 2011 (down from 58% in 2007).

POM audits and enforcement: There is little information available regarding separately sold batteries. With regard to EEE (and batteries in EEE), producer **c**ompliance can be assumed to be relatively high. Since 2006, enforcement actions by the KLIF (MD)-managed register of EEE producers has led to almost 4,000 new producer registrations and by mid-2009, five 'free-riding' importers of EEE had to pay a total of EUR 300,000 in fines and back-dated fees. With regard to WEEE collection, past disagreements between the WEEE organisations and KLIF (MD) suggest there is room for improvement in the tracking of waste material flows[148].

Potential for improving collection rates

We assume that the density of collection points at retailers remains quite low and could be increased with the help of tighter enforcement of the retailers' take-back obligations.

Waste reporting could be improved by obliging treatment facilities to report batteries received to authorities.

[148] In 2009/10, WEEE organisations stopped collection several times because of mistrust of the other organisations' data. A 2010 audit of the organisations by KLIF found most organisations' reporting deviated substantially from legal requirements. In June 2009, six containers of illegally-shipped WEEE were returned by Dutch authorities to a sub-contractor of Ragn Sells Elektronikåtervinning which subsequently changed its name to Elsirk.

POLAND

Key points

- Since 2002, the Act on Entrepreneurs' Obligations has required producers to individually achieve collection targets and pay a product fee if the targets are not met. The Batteries and Accumulators Act of 2009 left the collection target cum product fee mechanism in place. The Act does not define or regulate compliance organisations and battery collectors. However, a comprehensive amendment to the Batteries Act introduced *inter alia* a formal role for compliance organisations from 2015.

- Around 50 organisations **(2014: 56)** provided battery compliance services to 99% of around **2300** registered portable battery producers (1% complied individually). These organisations include battery organisation REBA, set up in 2003, as well as entities set up by WEEE organisations, such as ERP Poland, whose market share increased from 10% in 2012 to 28% in 2013.

- The collection rate increased steeply to 43% in 2011 while showing implausible amounts of lead batteries. This issue was cleared in 2012, when the collection rate fell to 29%. **In 2013 and 2014, collection increased (in 2014 alone by 15%) and the collection rate moved up to 30% in 2013 and 33% in 2014. About 25% of producers missed the national collection target of 30% in 2013 and 35% in 2014 and the 40% in 2015 remains challenge.**

- **Environment Agency GIOS suggests to increase collection by significantly increasing the product fee and engaging municipalities effectively in waste battery collection through amendments to the Public Cleanliness Act.**

Regulatory parameters for compliance organisations

Legislative background

Batteries are subject to mandatory take-back legislation as well as product fee legislation: Since 2002, **the Act on Entrepreneurs' Obligations** has required producers and importers of batteries[149] to achieve recycling targets, and product fees have been applied if these targets were not achieved.

The **Batteries and Accumulators Act of 2009** transposed the take-back obligations of Directive 2006/66/EC and repealed a previous Ordinance. The product fee required under the Act on Entrepreneurs' Obligations remains in place. The Batteries Act is complemented by over 20 implementing orders, including one of March 2012 setting criteria for the allocation of grants for public awareness campaigns. A comprehensive amendment to the Batteries Act, finalised in late August 2014, introduces *inter alia* a formal role for compliance organisations from January 2015 [which were neither defined nor regulated by the 2009 Batteries Act, as producers had to contract directly with collectors and recyclers] and additional penalties for a wider scope of violations.

A new **Waste Management Act**[150] of January 2013 radically changes the management of municipal solid waste which may have a major impact on the operations of the current producer responsibility organisations: The new Act *inter alia* requires municipalities to provide collection points for certain waste products including WEEE and waste batteries from July 2013 and makes them responsible for the disposal of such wastes. It appears that so far a majority of municipalities have decided to continue the waste battery collection organisation in public offices, schools and retail outlets which are operated by the current producer responsibility organisations.

149 As well as to cooling equipment, packaging, lubricating oils and tyres

150 Act on Waste, O.J. 21/2013. The Act i.a. amends the Act on Maintaining Cleanliness and Order in Municipalities, O.J 152/2011, item 897

Roles and responsibilities in waste portable battery collection

- Until January 2015, **producers** are individually responsible for meeting annual **collection targets** (18% in 2010, 22% in 2011 and 25% in 2012, then increasing 5% annually to reach 45% in 2016). To meet the target, they must conclude an agreement with a waste battery 'collector' and a battery treatment facility. Producers that do not achieve the collection targets are subject to the product fee of PLN 9 per kg (~EUR 2,040 per tonne) on the difference between the collection target and the actual collection volume. From January 2015, compliance organisations - 'intermediary entities' - may take over battery producers' obligations.

- Unlike the WEEE Act, the Batteries Act did not define or regulate **compliance organisations**[151] and – again unlike for WEEE collectors – there is no registration or licensing requirement for waste battery collectors. *[In practice, battery collectors provide compliance organisation-like services to producers, such as administrative support for reporting and organising public awareness campaigns, without taking over their legal obligations.]*

- Since 12 September 2009 battery **retailers** with a sales area over 25m^2 have had to offer take-back and must hand over collected waste batteries to wholesalers or collectors.

- From July 2013, **municipalities** are obliged to collect waste batteries.

- Waste battery **treatment facilities** must be registered and licensed and are responsible for reaching the recycling efficiency targets[152].

Requirements on compliance organisations

Under the 2014 amendment of the Batteries Act, compliance organisations will from 2015 *inter alia* be required to

- register with the register of battery producers,
- have EMAS or ISO 14001 compliant environmental management organisations in place and
- pay a fee for public awareness initiatives of PLN 0.03 (EUR 0.007) per kg of batteries put on the market (POM) by their producer members to the regional environmental authorities.

There are no requirements regarding the legal form or ownership of compliance organisations.

[151] The producer responsibility obligations for batteries in the 2008 Batteries Act are diametrically opposed to those introduced for WEEE three years earlier: while collective WEEE organisations are tightly regulated and play a key role in WEEE management, the batteries legislation does not allow battery producers to transfer their obligations to a third party but requires producers to comply individually and does not envisage collective organisations at all. **However, a new WEEE Act, in force from 2016, regulates WEEE organisation and i.a. requires that they are established and controlled by producers.**

[152] From September 2011, however the first report will be required for 2014 as set out in Commission Regulation 493/2012/EC.

Development of compliance organisations

In response to the Act on Entrepreneurs' Obligations, large battery producers[153] set up not-for-profit battery compliance organisation **REBA** in January 2003 and a number of smaller battery organisations followed. As collection targets were not always achieved[154], the product fees had to be paid to the National Fund for Environmental Protection (**NFEP**)[155].

As the 2009 Batteries Act does not recognise collective organisations, the battery organisations assumed the role of battery collectors and have contracts with at least one of 23 registered treatment facilities.

99% of the 2,000 battery producers use the administrative support of 52 'collectors', including battery organisation REBA and entities set up by some of the 8 approved WEEE compliance organisations (the WEEE organisations themselves are restricted to fulfilling WEEE obligations only) and some of the 20 packaging compliance organisations.

In terms of batteries placed on the market, REBA had a market share of 31% in 2011. Due to the change of affiliation of a large producer, ERP Poland's share of POM and collection increased from 10% in 2012 to about 28% in 2013 at the expense of REBA. In terms of membership numbers, the 3 largest 'collectors' were **CCR**, **Bioorganisation** and **Auraeko**.

Market shares and clearing for over- and under-collection

There is no need for clearing as the collection target and the obligation to pay the product for failing to reach the target (which 25% of producer did in 2013 and 2014) applies to individual producers.

Interface with WEEE organisations

WEEE organisation **ElectroEko**, (with a share of about 50% of EEE POM) does not offer battery compliance and refers its members to REBA. Most other major battery compliance service providers – except for REBA – are linked to WEEE compliance organisations and as such have access to batteries removed from WEEE.

153 Current shareholders are Energizer Group Poland, GP Battery Poland, Spectrum Brands Poland, Panasonic Energy Europe

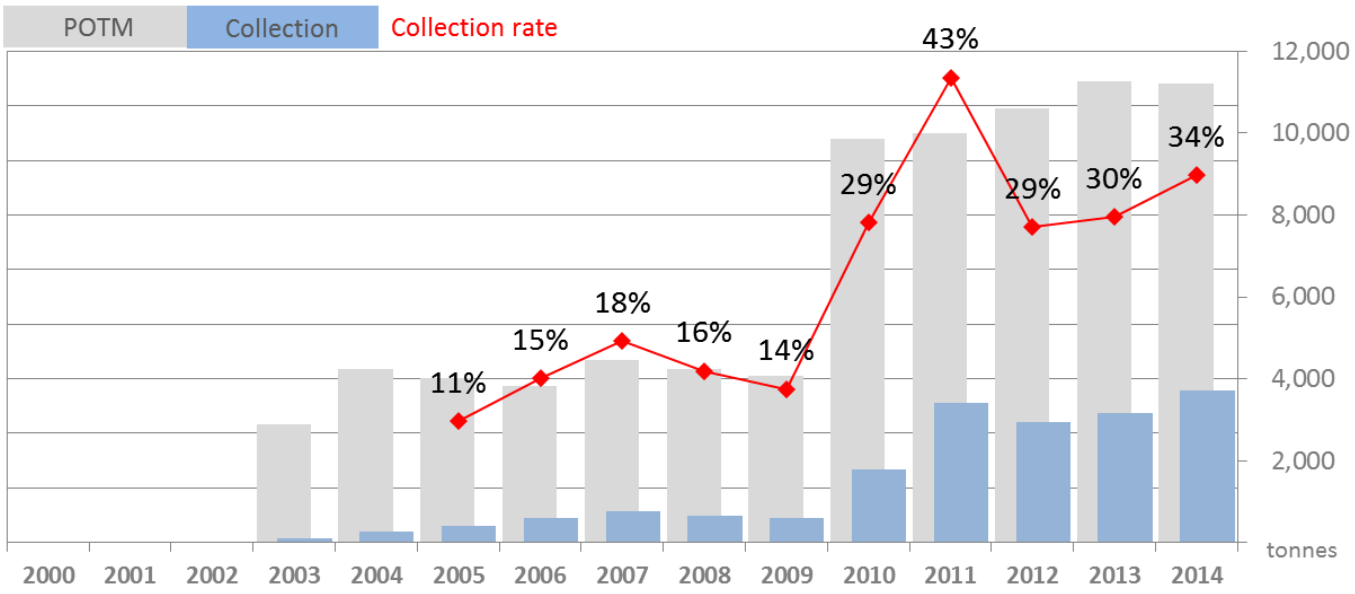
154 REBA reported that 2006 was the first year in which it met recycling and recovery targets. It was also met in 2007 and 2008.

155 We estimate NFEP's cumulative revenues from battery producers by the end of 2007 at PLN 12.6 million (EUR 2.87 million). 2011 and 2012 saw no product fee revenue from batteries as all producers reported to have reached the targets. **For 2013 and 2014, we estimate revenue at around EUR 0.5 and 1 million**.

Collection results

Due to the lack of collection infrastructure and low public awareness, collection of waste portable batteries increased slowly: collection hovered between 10 g and 20 g per capita between 2004 and 2009. In 2009, with a collection target of 18%, REBA collected 598 tonnes of portable batteries, representing a collection rate of approximately 19%.

Data from Environmental Inspectorate GIOS show that the collection rate jumped from 29% in 2010 to 43% in 2011. However, the 2011 collection volumes contained implausible amounts of lead batteries. For 2012, GIOS data show a plausible return rate for portable lead batteries (105%), which contributed to the drop of the collection rate to 29% in that year. **In 2013 and 2014, collection increased (in 2014 alone by 15%) and the collection rate has moved up to 34% in 2014. 25% of producer missed the nations target in 2013 (30%) and 2014 (35%).**



Source: 2010-2014 GIOS reports; Pre 2010: REBA collection only

Drivers affecting the collection rate

Availability of collection points and use of collection channels

We estimate about 35,000 (2012) static waste portable battery collection points in Poland, or one per 1,100 residents. Collection events and mobile collections also play an important role.

With the exception of REBA, few data are available about collection sources and points. Until 2012, REBA collected 80% of its waste batteries from schools which hosted around 40% of its over 27,000 collection points. The remaining volumes derive in approximately equal parts from retail, industry users and sorting centres of municipal solid waste[156]. From 2013 REBA has ceased to compile data on collection "by source" and to report aggregate figure of batteries collected since no other battery compliance schemes are publishing such results.

Due to the lack of data and changes in the market of compliance organisations, the number of collection points and share of collected batteries cannot be estimated for 2013. The numbers for 2012 were estimated as follows:

Collection point hosts	***Number of collection points, 2012***	***Share of total waste battery collection, 2012***
Retailers serviced by organisations	20,000	8%
Municipalities*	750	17%
Schools	11,000	43%
Companies	5,000	32%
WEEE dismantlers		1%

* Of which around 3% from separate collection and 14% from sorting centres of municipal solid waste

Source: Own estimates based on partial data of organisations

Consumer awareness

Supporting legal requirements

- Until the end of 2014, **producers** *of all battery types* must spend a minimum of 0.1% *of turnover* from batteries to raise public awareness of the collection of waste batteries, either by organising campaigns themselves or by paying an equivalent amount to the environment agency of the province in which they are based. *[Note: Under the WEEE Act, EEE producers or WEEE organisations must invest 5% of revenues.]* This resulted in payments of PLN 1.8 million (EUR 422,000) from producers of all battery types in 2010 **(2014: PLN 2.2 million)**. From 2015, compliance organisations must pay a fee for public awareness initiatives of PLN 0.03 (EUR 0.007) *per kg* POM by their producer members to the regional environmental authorities. We expect this to increase the funds collected by 40%.

- **Retailers** of batteries with a sales area above 25m^2 must provide containers for waste batteries in a prominent location and inform customers about waste batteries.

- Since August 2012, a new **school curriculum** has included education about waste management for primary and high school students, including the need to separate wastes and for the special handling of spent batteries, fluorescent lamps and expired medicines.

[156] Material recovery facilities (MRFs)

REBA

From 1 April 2013 REBA no longer provides a collection point locator but refers people to the website of the Regional Environmental Protection Agencies (example of the **Warsaw office** with downloadable **educational information**).

- **Collection boxes and retailer awareness:** REBA collects batteries from around 14,000 collection points at retailers. REBA provides easily recognisable bright green collection containers with accompanying posters and flyers. Information booths are regularly set up in supermarkets and malls to raise awareness.

2015:

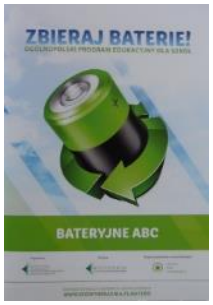
- **School campaigns:** Collection containers are also located in nearly 10,000 schools, kindergartens and educational institutions. REBA notes that the intensity of its collection organisation in schools cannibalises retail collection, as return through its retail collection points remains low (below 3 kg per point per year). Awareness programmes for students include educational booklets and teaching materials as well as competitions such as art contests and collection competitions. Points are awarded in respect of volumes collected. Points can then be exchanged for prizes.
-



- **Public events:** In 2011, REBA set up a booth at the Earth Day fair in several cities, providing collection services, educational games and competitions and informing children and families of the need to recycle used batteries.

Bioorganisation

- **Collection points:** Bioorganisation places collection boxes in retail chains such as Rossmann drugstores. 440 Tesco stores were supplied with special containers (right-hand image) that collect three wastes in separate compartments: cables, CDs and DVDs (red); waste batteries (orange); and toner (blue).

- **Educational campaigns:** In 2011, Biosytem organised educational programmes and a competition for schools in cooperation with Tesco. Schools can order educational materials (**here**)

Auraeko

Contest

ERP Polska

- **Awareness and collection events:** ERP Poland periodically sets up collection booths in public places, offering battery collection and information on recycling.

2015:

- **Campaigns:** In 2011, ERP Poland took part in an Ecological Picnic along with other collective organisations, recycling companies and municipalities, setting up a collection booth and providing entertainment and education for attendees. In 2012, on Women's Day, ERP Poland established booths in town centres, where tulips were given in exchange for used batteries. On Valentine's Day 2011, ERP Poland launched a campaign entitled 'I love Recycling' where collection points were established in pre-schools and sweets were given in exchange for used batteries.
-

- **Internet & social media**: ERP Poland operates a Facebook page, and has uploaded educational videos to YouTube. **In a browser-based game children compete to collect the most batteries in a limited time. The top 10 players received awards in March 2014.**

- In 2013, ERP has run a number of educational campaigns, some with WEEE awareness programs, e.g. Eko-valentines day (exchange batteries in return for lollipops in the shape of heart), battery school collection and educational program "Zbieraj z klasą" ("Collect with class") and a photo contest. **ERP also takes part in public fairs and various tradeshows, setting up booths to provide information and WEEE & battery collection.**

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM reports must be broken down by chemistry only. GIOS audits POM of about 15-20 producers annually.

Collected volumes are reported before sorting to identify whether producers have achieved collection targets. Recyclers then report waste battery volumes in accordance with the European waste catalogue codes (16 06 01; 16 06 02; 16 06 04/05).

Enforcement activities **continue** to be frequent and systematic in comparison to those in other countries Here a summary of of activities in **2011. A similar amount of activities is undertaken each year**:

- GIOS inspected a total of 77 registered entities (5% of the total number of entities registered) including 67 battery producers and 10 processing plants. 11 of the 67 producers were found to have committed violations, mainly incorrect labelling of batteries, failure to conduct public awareness campaigns and not printing registration numbers on documents. GIOS responded with orders for further audits, issuing of instructions and in one case a small fine.

- GIOS inspected 105 registered entities: 90 battery producers and 15 waste battery processing plants. Of the producers inspected, 44% were found to be in violation of the Batteries Act, including for failing to conduct public awareness campaigns, not printing registration numbers on documents, the absence of contracts with collection companies and deficiencies in reporting and a lack of records. 57 companies were instructed to eliminate irregularities, 32 further inspections were ordered, 18 companies were fined a total of PLN 3,900 (EUR 930) and 12 were referred for further prosecution.

Lead share: While the framework for control mechanisms exists, practical limitations such as understaffing appear to have **at least initially** prevented GIOS from improving the accuracy of collection data. For example, disproportionate share of portable lead acid waste batteries was reported in 2010 and 2011[157]. Removing lead batteries from the collection rate calculation would have resulted in a collection rate on a current year basis in 2010 and 2011 of an estimated 12% and 21% (rather than 18% and 34%), missing the national collection targets (18% and 22% for 2010 and 2011). **However, by 2012, the lead share has been reduced to a plausible level of 105% (resulting in a drop of the collection rate to 29%). In 2013 and 2014, GIOS data no longer show a separate chemistry breakdown of collected portable batteries. The lead share of POM was 4% and 3%.**

Potential for improving collection rates

Organisations (collectors): The collection rate could potentially be improved by a centralised coordination of awareness creation measures and collection campaigns by the competing organisations. **Retail:** Anecdotal evidence suggests that collection containers at retail stores come and go, leaving end-users who have made the effort to return batteries frustrated at not finding the container they had previously used. Tighter enforcement of the retailers' obligation to visibly and consistently display battery bins would increase consumer confidence in the organisation.

In its 2014 Batteries Report to the Government, GIOS suggests to increase collection by

- **significantly increasing the product fee (currently PLN 9 per underachieved kg) as this could compel producer to improve implementation;**
- **increasing mandatory financial contribution for public awareness campaigns;**
- **requesting municipalities to engage effectively in organising selective collection by setting up easily accessible hazardous waste collection points, increasing the number of other collection sites and conducting regular informational activities. Amendments to the Public Cleanliness Act of 1996 should be considered.**

[157] In an article in 'Recykling', battery organisation REBA points out that 39% (34 g per capita) of portable batteries collected in 2011 were lead acid batteries. At the same time, only 9 g of portable lead batteries were reported to have been placed on the market. This suggests that a large number of portable lead acid batteries were placed on the market as industrial batteries (for example for emergency lighting organisations).

PORTUGAL

Key points

- In response to the 2001 Decree on Batteries, which required producers to take back waste batteries through a licensed recovery organisation, not-for-profit battery organisation **Ecopilhas** was set up in 2002. Under the 2009 **Batteries Decree Law** transposing Batteries Directive 2006/66/EC, the two WEEE organisations AMB3e and ERP Portugal were licenced as battery organisations in addition to Ecopilhas in March 2010. Organisations are tightly regulated. Each must achieve collection targets, increasing annually from 25% in 2010 to 45% in 2015. Municipalities remain responsible for collecting waste batteries and must be compensated by the organisations for their services.

- **After a peak of 33% in 2011, the estimated collection rate is 28% in 2014. Collection peaked in 2011 and since 2012 has remained largely constant at pre-2011 levels. POM has remained low (160 g per capita) since the 2008 economic crises but increased in 2014 (+5%).**

- A framework agreement or common interface between organisations and municipalities would facilitate the coordination of collection and awareness creation measures.

Regulatory parameters

Overview

Decree-Law 62/2001 required manufacturers and importers to collect waste batteries and accumulators 'capable of collection and treatment by existing organisations or those subsequently created for this purpose' without charge to the end-user, and to reimburse municipalities for the costs of collecting batteries from households. A licensed recovery organisation, to which producers could transfer this obligation, had to be in operation by July 2001. Decree-Law 6/2009 transposed Batteries Directive 2006/66/EC. **There were no significant legislative changes between 2013 and 2015.**

Roles and responsibilities in waste portable battery collection

- From September 2009 **producers** are required to manage waste batteries through a collective or individual organisation. The obligation must be legally transferred to an organisation for a minimum of 2 years.

- **Organisations** must provide easily accessible collection points, including at municipal collection centres and retailers, and may not sign exclusive contracts with waste management companies. They must spend 2% of revenues on R&D and at least 5% on information campaigns. The organisations' recycling fees are part of the licence agreement and may not be changed without government approval.

- Organisations must achieve **collection targets,** increasing annually from 25% in 2010 to 45% in 2015.

Collection target as % POM*	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
AMB3e and ERP	5	25	27	31	36	41	45
Ecopilhas	15	25	27	31	36	41	45

** as defined in the licence of each organisation*

- **Retailers** must take back waste batteries even when no new battery is purchased, and must set up collection containers at point of sale.

- **Municipalities** must collect waste batteries, and are subsequently compensated by the organisations according to the amounts collected.

Requirements on compliance organisations

Organisations are very tightly regulated. They must:

- be established as not-for-profit organisations by producers or other entities active in waste management;
- be licensed by environment agency APA on the basis of a waste and financial plan;
- cover the whole territory;
- be financed through fees based on quantities placed on the market, composition and treatment. Fees must be approved by APA and revisions are only possible up to 30 September each year;
- assume obligations of the producer by written contract that includes forecasting quantities placed on the market by type of battery and reporting monitoring activities to ensure compliance.

Development of compliance organisations

In response to the 2001 Decree on Batteries, battery producers and importers[158] and electronics industry association **AGEFE**[159] set up a not-for-profit organisation, **Ecopilhas**, in 2002. A Statutory Commission for the Management of Batteries and Accumulators (CAPA) oversaw the operation of the organisation. CAPA was chaired by a representative of the Environment Ministry and its members were drawn from other relevant ministries, the National Association of Portuguese Local Authorities, affected trade associations and recovery organisations and Regional Governments.

Under the 2009 Decree Law, three organisations were licenced as battery organisations in March 2010: **Ecopilhas**, plus WEEE organisations **AMB3e**[160] and **ERP Portugal**. The licences are valid until 31 December 2015. About 900 battery producers comply through all organisations, over 2/3 through Ecopilhas. As regards the market share by volume, Ecopilhas should collect between 70% and 80% of all waste batteries, the shares of Amb3e and ERP Portugal are not known[161].

Municipalities remain responsible for collecting waste batteries, and organisations should supply them with collection containers and compensate them for their service under a contract. Ecopilhas used to pay municipalities EUR 46.65 per tonne of waste batteries taken back. Current rates are not known.

Conditions of the other organisations have not been made public. No framework agreement or common interface between organisations and municipalities exists to ensure that obligations are fulfilled nationwide in a harmonised manner.

Clearing for over- and under-collection

Clearing is not required as the collection targets are defined in the licence of each organisation.

Interface with WEEE organisations

Most producers of separately sold batteries have joined Ecopilhas, while producers of batteries integrated into WEEE comply for batteries through their WEEE organisations. The organisations are subject to the same battery collection targets, despite the different nature of the organisations' membership (and the fact that return rates for batteries integrated into EEE should reflect WEEE return rates).

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158 Cegasa - Comércio de Pilhas, Energizer, S.A., Procter & Gamble Portugal, Higiene e Saúde, S.A., Sony Portugal, Lda., Varta Geratebatterie Gmbh

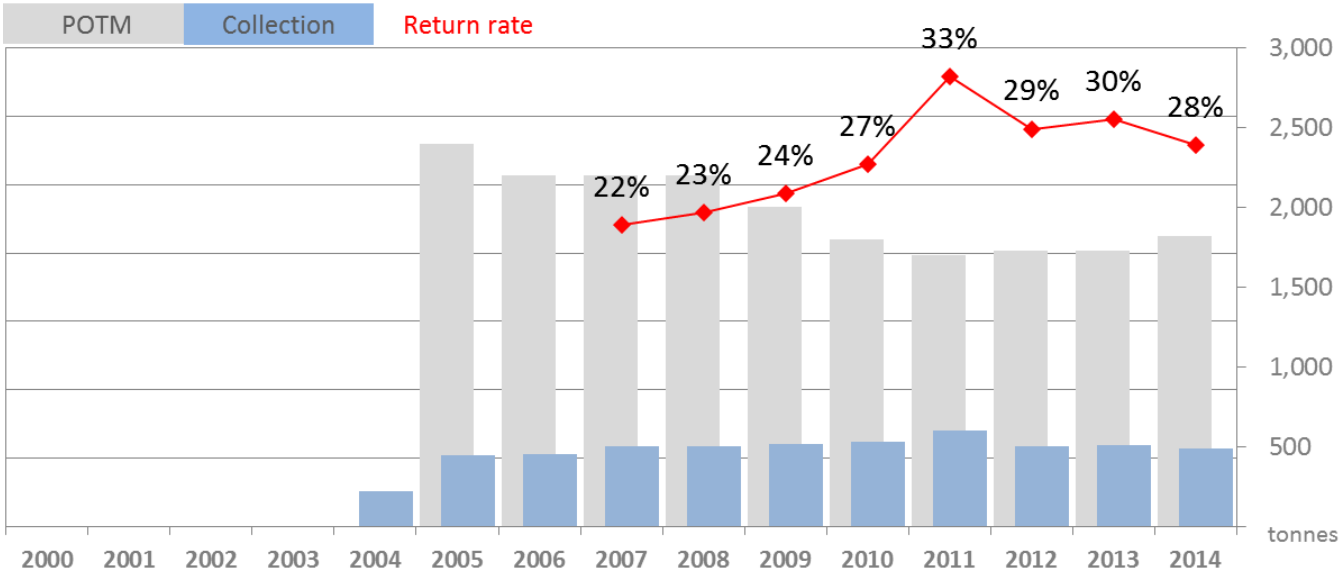
159 Associação Empresarial dos Sectores Eléctrico, Electrodoméstico, Fotográfico e Electrónico

160 AMB3E was founded by 56 members, including the local offices of Bosch, Candy Hoover, LG, Miele, Philips, Samsung, Sanyo and Whirlpool, supported by 60 associations

161 As regards WEEE, the organisations' 2006 licences define the market share for the 5-year duration of the licence: AMB3e should collect 79% and ERP 21% of WEEE. APA's 2011 urban waste report (published in March 2013) shows that the actual shares are very close to this, with Amb3E's 78% and ERP's 22%. The report notes that 7.2% of WEEE was collected by the organisations directly, and the rest through municipalities. There were 2,000 WEEE collection points for end-users nationwide.

Collection results

Estimated[162] collection increased slowly between 2005 and 2010 and fast in 2011 (+14%). By 2011, POM had decreased by nearly a quarter compared to 2008 as a result of the economic crisis. This lead the estimated collection rate to a peak at 33% in 2011. **From 2012 to 2014 collection volumes largely stayed at pre-2011 levels, while POM began to increase slightly only in 2014 (+5%), leading to an estimated collection rate of 28% in 2014.**



Source: Estimates from organisations, notably Ecopilhas

Drivers affecting the collection rate

Availability of collection points and use of collection channels

We estimate a total of around 19,500[163] collection points for portable batteries in Portugal, or one per 540 residents. **APA**'s 2011 urban waste report says that the separate collection network for waste portable batteries is based on municipal waste collection services (which are legally obligated to collect waste batteries). Other collection points are installed by the battery organisations at retailers, schools, hospitals and other entities. APA says that, of the 454.6 tons of waste batteries collected, 41% derived from the organisations' own collection and the remainder from municipalities' collection[164].

Number of collection points and share of collected batteries, 2012 own estimates:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations		30%
Municipalities		25%
Schools	No data	No data
Companies		
WEEE dismantlers		

[162] Due to the two licensed producer registers (Ecopilhas as well as ANREE - used by ERP and AMB3E), POM data are uncertain: Our estimate is based on collection data released by producer register **ANREE** and data from Ecopilhas, which preferred to announce collection data in battery units (8 million in 2004, 16 million in 2005, 20 million 2009, 2010).

[163] Based on an estimated 17,000 Ecopilhas collection points and 2,500 WEEE/battery collection points by AMB3e and ERP Portual.

[164] Another APA report, the **2011 Environmental Declaration** notes that in 2011, the waste from Alkaline batteries (EWC 20 01 34) reported to waste register SIRAPA was 0.5 kg in 2010 and 1.3 kg in 2011, presumably per capita.

Consumer awareness creation

Supporting legal requirements

Organisations must spend no less than 5% of revenues on information campaigns.

Ecopilhas

- **Retailer awareness & collection boxes:** Ecopilhas distributes easily recognisable red and green collection boxes to retailers, bundled with flyers explaining their obligations.

- **School collection boxes and campaigns:** In late 2012, Ecopilhas re-launched the campaign 'Pilhão vai à Escola', which placed battery collection bins in a number of schools. Schools are awarded points for volumes collected. Prizes are awarded for best collection result per student and the school with the highest total collection volume. In similar campaigns in 2008 and 2010, around 1,500 collection boxes in schools were distributed. A **Facebook** page complements activities for younger target groups.

- **Charity campaigns** use various media, including Radio. In late 2012 Ecopilhas launched a nationwide campaign in cooperation with the Portuguese Institute of Oncology. As in previous campaigns, Ecopilhas' main collection partner was supermarket chain LIDL. Over 4 million batteries were collected, allowing Ecopilhas to contribute a donation to the fight against cancer (**details**).

  In 2011, Ecopilhas, together with Pingo Doce supermarket, donated 10,000 litres of milk to nineteen social and charitable institutions.


ERP Portugal

- **School campaigns:** Since 2007, the project projeto Geração Depositrão has distributed educational materials and collection boxes for small WEEE, lamps and batteries to participating schools. Schools can also participate in games and creative activities, applying the philosophy that 'children are excellent at influencing the behaviour of adults today and both should know how to behave in the future'. The communication is based around a WEEE team led by Capitão Fluxo (Captain Flow).

  The campaign collaborates with the national '**Eco Escolas**' programme, an environmental education programme started in 1996 by the European Blue Flag Association (**ABAE)** and the Ministry of Education. Around 1500 schools and 230 municipalities currently participate.

School collection box for small WEEE and batteries. Batteries are to be deposited in the small slit to the right of the yellow arrow



- **Social media: ERP-Portugal maintains a Facebook page where it informs the public about campaigns and competitions.**

Amb3E

Amb3E focuses on the collection of WEEE, notably through 'Ponto Electrão' outdoor containers which are provided to municipal and other collection points. In its 2011 Urban waste report (published in March 2013), APA lists outreach and communication activities that AMB3E conducted in 2012 jointly for WEEE and battery collection, including 134 lectures in schools.

According to its annual report, Amb3E collected 21 tonnes of portable batteries in 2012. Batteries are stored until sufficient volumes for economical treatment are collected.


Consumer awareness and disposal behaviour

In February 2009 Ecopilhas reported results of a survey focusing on its brand recognition which found that

- between 2006 and 2009 awareness of the need to dispose of batteries separately increased from 77% to 79%
- 88% of respondents remembered seeing the Ecopilhas pilhão collection boxes (2008: 77%)
- 54% recalled Ecopihas campaigns

Data accuracy

POM data collection is difficult as there are two approved registers for battery producers, Ecopilhas and ANREE (used by ERP and AMB3E)[165].

Organisations report **collection** volumes by EWC codes 20 01 33, 16 06 03. IGAMAOT (Inspectorate of the Environment) is responsible for enforcement measures.

Potential for improving collection rates

Clearing is *prima facie* not required as the collection targets are defined in each organisation's licence. However, as municipalities remain responsible for collecting waste batteries and organisations should supply them with collection containers and compensate them for their services under a contract, a framework agreement or common interface between organisations and municipalities could facilitate fulfilling these obligations.

[165] Environment agency APA provides reporting **guidance** for various products but not? Batteries Though there is a guidance doc on batteries listed.

ROMANIA

Key points

- Although Batteries Directive 2006/66/EC was transposed by a Decree in 2008 and producers had to be registered from July 2009, subsidiary legislation required for implementation was delayed until November 2011 and the first battery organisation was only approved in April 2012. **Romania is one of a the few 'new' member states that transposed the Batteries Directive without a state fund mechanism. Draft legislation of October 2015 proposes a similar mechanism to fine producers and compliance organisations for missing collection targets.**

- Currently four battery organisations are operating.

- The progress of awareness creation and battery collection activities has been impressive. Collection volumes doubled between 2011 and 2012, and increased by 7% in 2013, while nominal POM decreased by -58% in 2013. The 2013 collection rate is estimated at 14%. **Data for 2014 are not yet available.**

Regulatory parameters for compliance organisations

Overview

Decree No 1132/2008 transposed Batteries Directive 2006/66/EC and was complemented by ministerial orders in July and October 2009 which defined registration and reporting procedures for producers. However, Joint **Order 2743/2011** of the Environment and Economy Ministers – which specifies licensing requirements for organisations – was delayed until November 2011 due to stakeholder concerns, and the committee to approve the organisations was only appointed in February 2012. A 2012 amendment to the Order provided procedural details for the cancellation of organisations' licenses. **A draft Amendment to the Emergency Ordinance on the Environmental Fund, released in Oct-15, proposed to introduce penalties[166] on producers and compliance organisations for missing WEEE and battery collection targets.**

Roles and responsibilities in waste portable battery collection

- **Producers** must set up organisations to achieve the collection targets of the Directive (25% by 2012; 45% by 2016).

- Authorised **organisations** must allow end-users to deposit waste batteries free of charge and require **retailers** to collect from end-users without their having to make a purchase. Battery organisations may be run in conjunction with **WEEE organisations**.

- **Collection points** are not subject to registration or permitting requirements.

- **Municipalities** are not obligated to collect waste batteries.

Requirements on compliance organisations

Provisions of Order 2743 of 21 November 2011 on the licensing of battery organisations specify a license period of 3 years and license fees of LEI 10,000 (~EUR 2,250) for collective organisations and LEI 3,500 (~EUR 790) for individually-complying producers. Organisations seeking or reapplying for authorisation with environment agency NEPA must:

- provide a viable operating plan for achieving the collection targets on a national level
- take back any types of waste batteries offered by collectors
- accept applications from any producer

166 **At RON 5 per kg (EUR 1,100) of batteries on the underperformed amount which is very low compared to e.g. LT, LV or PL.** ***[We estimate total fines in conjunction with the 45% target in 2016 at EUR 0.5 m].***

- not discriminate between contracted producers and shareholders
- inform the approval commission of any changes of fees
- conduct educational and awareness campaigns as well as relevant studies
- provide the approval commission with an activity report by 28 February each year for the previous year, listing contracted parties (producers, collectors, sorting facilities, recyclers), data on waste streams managed, financial information, an independent financial audit, minutes of board meetings and (where necessary) outline reasons why targets have not been achieved
- reinvest profits or any excess of revenues over costs
- maintain a minimum equity of LEI 100,000 (~EUR 22,500) throughout the duration of the operating license.

Development of compliance organisations

Market of collection organisations

In response to the Batteries Decree of 2008, some of the six authorised WEEE organisations and the Romanian Portable Battery Association[167] considered setting up battery organisations. However, due to the absence of an Order on organisation approvals, no applications were filed until late 2011. A new organization, RECOBAT Plus became the first approved battery organisation in April 2012. Since early 2013, the following four organisations have been approved:

- **ECOTIC BAT** Ltd, an independent entity established by ICT producer-controlled WEEE organisation **ECOTIC**, was approved on 11 September 2012 for portable and industrial batteries. WEEE organisation ECOTIC was established in April 2006 by members of IT industry association APDETIC.

- **SNRB**, the 'National Organisation for the Recycling of Batteries' founded by battery importers in 2008, was approved on the same day for portable batteries only. It partners with WEEE organisation **Environ Association**, founded by retailers and importers, whose members include LG. In August 2008 Environ had more than 1,000 WEEE collection points managed by municipalities and partner shops.

- **RECOBAT Plus**, founded in 2010 by professionals from the IT sector and related to WEEE organisation **Ecopoint** (approved 2011, but currently not listed as an authorised WEEE organisation).

- **CCR Rebat**, operated by the Romanian subsidiary of the German-based Reverse Logistics GmbH which operates portable battery compliance schemes in Austria, Germany and the UK.

WEEE organisation RoRec, founded by CECED Romania in 2007, is no longer listed as approved waste battery organisation in 2014. RoRec launched a waste battery collection, recycling and awareness programme in October 2009, and by December 2010 RoRec had installed more than 630 collection containers.

The organisations contract over 160 waste management companies authorised to handle portable batteries.

Interface with WEEE organisations

The largest WEEE organisations - Ecotic, RoRec and Environ - are controlled by producers or retailers. It can be assumed that their sister battery organisations have the largest market share for batteries.

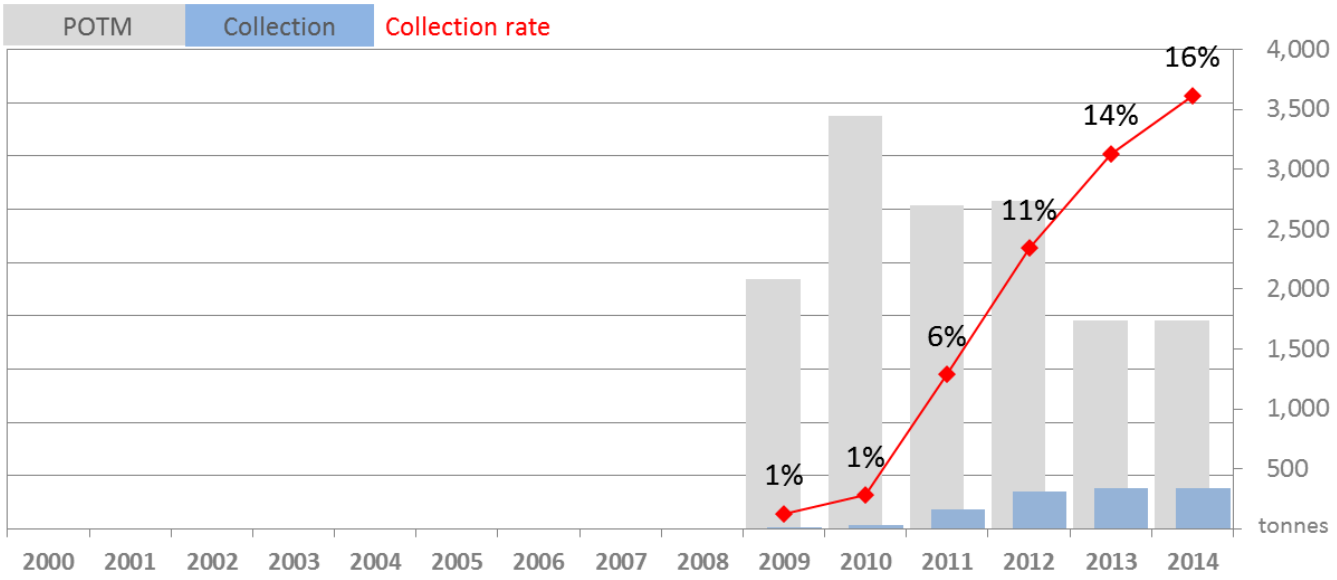
Market shares and clearing for over- and under-collection

Due to the WEEE collection target, a clearing mechanism for WEEE is not required. Collection targets for batteries apply only in 2012 and 2016. It is not clear how organisations intend to clear in the remaining years, if required.

[167] The Romanian Portable Battery Association (RPBA) was established in July 2005 by nine companies (Germanos Telecom Romania S.A., Varta Rayocan Remington Romania, Advance Photo International, Sprinter 2000, Telezimex, Global Logistics Organisations, Footmark Romania, Seca Distribution, Consumer Product Network) to assist the government to help implement Batteries Directive 91/157/EEC. Since September 2006 Philips, Vitacom and Master Pro have joined the RPBA.

Collection results

Waste portable battery collection doubled between 2011 and 2012, and increased 8% in 2013. POM volumes fell by nearly 40% in 2013. The collection rate achieved in 2013 is estimated at 14%. **Data for 2014 are not yet available. Assuming 2013 volumes results in a collection rate of 16% in 2014.**



Source: Ministry of Environment (MoE); 2013 MoE estimates, 2014: 2013 volumes assumed

Drivers affecting the collection rate

Availability of collection points and use of collection channels

No data.

Awareness creation measures

SNRB

- **Collection boxes:** Green cardboard collection boxes are distributed to retailers, supermarkets, schools etc.

- **Public awareness campaigns:** Since October 2011, SNRB, in cooperation with the ministries of education and environment, has been running a national awareness campaign on the importance of recycling WEEE and batteries. The campaign, entitled '**Baterel**', targeted student (primary and secondary school) and teachers. The campaign featured competitions between schools where points would be rewarded for collection and exchanged for prizes. Information materials (posters, flyers etc.) were also distributed, as documented also on SNRB's **Facebook** page.

  In 2010, SNRB ran an awareness campaign in the city of Iasi to promote the new collection infrastructure in publically accessible locations around the city and in schools (right image).

CCR Rebat

- **Collection boxes:** CCR Rebat offers collection boxes, bundled with informational material, free to retailers and municipalities.

Ecotic

- **Collection boxes:** Ecotic standard collection box follows the silhouette of Ecotic's logo. Larger containers use several formats, including for mixed collection of lamps and batteries (right image).


- **Public awareness campaigns:** From March to June 2013, Ecotic and the Environmental Protection Agency ran a campaign in Brasov County schools. The campaign, entitled 'Be an example! Separate used batteries', targetted school students of all levels and teachers and involved 131 participating schools. The campaign provided schools and teachers with educational materials for spreading awareness on battery recycling amongst students. The campaign also included a competition, where schools competed for the largest volumes of waste batteries collected with prizes to be won.

  From February-May 2013, a public awareness campaign, titled 'Guerrilla Green' ran in 6 cities across Romania: Bacau, Ploiesti, Iasi, Focsani, Buzau and Bucharest. During the course of the campaign, a large green caravan made stops in different locations in each city – its purpose was to spread awareness of the need to recycle batteries and aluminium cans. The campaign was supported by the Ministry of Environment, the Ministry of Education, ANPM (the Romanian producer register) and Alucro (aluminium can recycler). **The 2013 campaign 'Little ones do big things' provided learning materials and collection boxes to kindergartens. The campaign has been renewed annually.**


In November 2014 Ecotic launched the mobile-classroom 'Ecotic Life' featuring a caravan which has been fitted to provide WEEE and waste battery information for educational purposes. The project will run until mid-2016.

- **Social media:** Ecotic maintains a Facebook page where it updates followers on news and events.

RoRec

- **Collection boxes:** RoRec offers a highly visible range of collection boxes for small WEEE, lamps and batteries.

Accuracy of reporting

Both POM and collection reports must be broken down by battery type and – for portable batteries – 14 chemistries. It is questionable how accurately these requirements can be met.

Enforcement of the producers' obligations has been carried out by the National Consumer Protection Authority: In November 2010 it published results of a compliance check with the Batteries Decree. Of 620 entities checked, 443 (71%) were not compliant. 211 entities were fined a total of LEI 760,000 (EUR 180,000) and the marketing of 213 products had to be temporarily stopped. Violations included failure to identify the producer on batteries and failure to provide information in Romanian (140), failure to display the crossed-out wheeled bin symbol and / or heavy metal content (19) and failure to show the registration number on company documents. Free-riding is limited by the requirement for producers to display their batteries registration number on all commercial documents.

Potential for improving collection rates

Implementation is at a very early stage.

SLOVAKIA

Key points

- Since 2001, the Product Fee Act has subjected separately sold batteries to fees of the **Recycling Fund** on 100% of batteries placed on the market less the amount of batteries collected by producers themselves or collected on their behalf. The Recycling Fund is a non-state body run by a Government-appointed Board of Directors. Waste management companies **Mach Trade** and **Elektrorecyling** are two of four companies mandated to operate battery collection organisations for municipalities, financed by local taxes and the Recycling Fund.

- Though the producer responsibility provisions of Batteries Directive 2006/66/EC had not yet been transposed, some of the 16 currently approved WEEE organisations provide battery collection services to producers to reduce the product fee payments for their members, who must deliver collected batteries to Mach Trade or Elektrorecyling.

- **A new Waste Act, in force from 2016, introduces full EPR (competing organisation with clearing house), requires compliance organisations to be controlled by producers and abolishes the Recycling Fund.**

- Preliminary Government data indicate a collection rate of 33% in 2010, 71% in 2012, 48% in 2013 **and 66% in 2014**. The exceptionally high rates are supported by **very low POM (148 g per capita), presumably resulting from insufficient reporting of batteries in EEE. Collection volumes on a per capita basis are comparable to those in neighbouring countries.**

Regulatory parameters for compliance organisations

Overview

Since 2002, the non-state Recycling Fund set up pursuant to **Waste Act no. 223/2001**, has supported the financing of the management of selected waste streams, including batteries. Producers of separately sold batteries pay a fee according to weight of batteries placed on the market. Producers of EEE with integrated batteries pay fees for EEE only, but should report the weight and volumes of integrated batteries to the Fund.

In September 2009, Batteries Directive 2006/66/EC was partly transposed through **Waste Act Amendment 386/2009**, with the single market provisions of the Directive entering into force on 1 November 2009. The Act does not shift organisational responsibilities to battery producers and does not mention collective organisations. In late 2010, the Commission sent Slovakia a 'Reasoned Opinion', the first step towards infringement proceedings, for not having correctly transposed the WEEE and Batteries Directives.

Drafting of a **new Waste Act** began in early 2011 but failed to get through parliament due to massive disagreements over the draft's failure to prevent waste management companies from operating collective organisations and vice versa. In May 2013 Environment Minister Peter Ziga began a second approach. Consultations on the draft of a new Waste Act in April 2014 resulted in 2,600 stakeholder comments. **In March 2015, the new Waste Act was eventually published. It will come into force from 2016. Notably, it shifts organisational and financial responsibility for managing separately collected waste streams to authorized compliance organisation, abolishes the Recycling Fund and, require each municipality to sign a contract with 1 compliance organisation only (rather than with private contractors) and requires compliance organisations to establish a clearing house. Compliance organisations must be established and controlled by producers and importers. No private ownership or personal links to the government, waste collectors or recyclers are permitted**[168]**. Implementing regulations were approved in late November 2015.**

[168] Currently there are 18 'collective' WEEE organisations in Slovakia, with most of them linked to or owned by collectors and recyclers, while some producer- controlled organisations operate collection and treatment facilities.

Roles and responsibilities in waste portable battery collection, pre 2016

- **Municipalities** must set up collection points and allow access to **approved economic operators** that run battery collection organisations financed by the **Recycling Fund**.
- **Producers of separately sold batteries** must pay the Recycling Fund fee on 100% of batteries placed on the market at a rate of EUR 6,310 per tonne, less the amount of batteries collected by producers themselves or on their behalf.
- **Producers of batteries integrated into EEE** must finance treatment of integrated batteries that result from their WEEE take-back obligations through the options available in the WEEE legislation.
- **Retailers** must take back batteries free of charge. Wholesalers are not obligated to take back waste batteries.
- The legislation does not mention **collective organisations** for batteries and does not name the party obligated to achieve the 25% and 45% **collection targets.**

Requirements on compliance organisations, pre 2016

There are no legal provisions to establish collective battery organisations.

Development of compliance organisations

Waste management companies **Mach Trade** (through related company **INSA** Ltd) and **Elektrorecyling** are two of four companies mandated to operate battery collection organisations for municipalities. These activities are financed by local taxes and the Recycling Fund, which had revenues from battery producers of around EUR 0.7 million in 2010.

The **Recycling Fund** was set up on the basis of Waste Act 223/2001 in July 2001 as a non-state special-purpose fund. 11 of its board members represent industry associations, three represent ministries and three municipalities. The 7 members of the supervisory board are appointed by the Environment Ministry (3), the Finance Ministry (1) and industry associations (3). The fund is fed by product fees paid by manufacturers and importers of certain end-of-life products and packaging types. Since 2002, the fund has spent around EUR 7 million in subsidies for the waste management of batteries of all types, with the main beneficiary being the MACH TRADE Group for recycling and AKU TRANS for logistics of waste batteries.

Some of the 16 currently approved **WEEE organisations** charge EEE producers separately for integrated batteries. Some also take back batteries from retail members. All collected batteries must be delivered to Mach Trade or Elektrorecyling who operate the only approved battery treatment facilities in Slovakia. Major WEEE organisations are:

- **SEWA** (Slovak Electronic Waste Agency), now part of ERP, was founded in April 2005 by ADAT (Asociácia dovozcov audiovizuálnej techniky) and ITAS (Slovak IT Association). Collected batteries are sent to MACH TRADE .
- **Asekol** was incorporated in Slovakia on 19 July 2010 and founded by Czech WEEE organisation Asekol and Slovakian online wholesaler Fast Plus.
- **Natur Elektro** is a subsidiary of Natur-Pack, a collective organisation for packaging waste set up in 2006.

Clearing for over- and under-collection

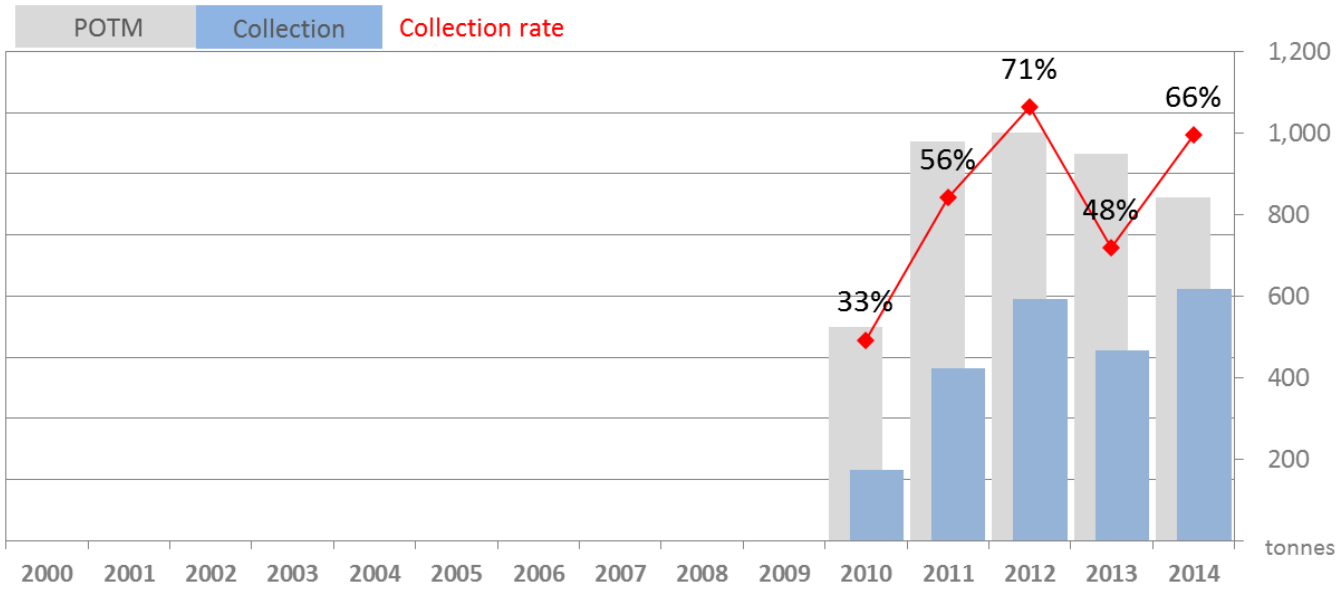
Not applicable due to producers' obligations to the Recycling Fund.

Interface with WEEE organisations

The 16-plus WEEE organisations must send batteries removed from WEEE to one of the two approved battery treatment facilities.

Collection results

Preliminary Government data indicate a collection rate of 33% in 2010, 71% in 2012, 48% in 2013 **and 66% in 2014**. The exceptionally high rates are supported by **comparatively low POM (154 g per capita in 2014)**[169]. The high share of waste batteries deriving from WEEE (WEEE organisations reported battery collection rates upwards of 100% in 2011 thus ensuring reduced product fee payments for producers) may suggest that batteries POM in EEE are not fully captured. **Collection reporting by chemistry, in force only from 2014**[170]**, did not affect the general trend of the collection volume (2014: 113 g per capita) which is comparable to those in neighbouring countries**[171]**.**



Source: Preliminary data from Ministry of Environment

Drivers affecting the collection rate

Availability of collection points and use of collection channels

We could not obtain information about the number of waste portable battery collection points in Slovakia.

Number of collection points and share of collected batteries, estimate 2011:

Collection point host	***Number of collection points***	***Share of total waste battery collection %***
Retailers serviced by organisations		
Municipalities		
Schools	No data	No data
Companies		
WEEE dismantlers		

169 For comparison – POM 2014: **PL 309 g, CZ 370 g per capita**

170 As a result of the implausibly high 2012 collection rate, a new Decree (310/2013), adopted in September 2013, introduced stricter reporting requirements for the management of portable batteries.

171 For comparison – Collection 2014: **PL 97 g, CZ 110 g per capita**

Consumer awareness measures

MachTrade/Insa

- Collection boxes:

- **School campaigns:** MachTrade/Insa launched a nationwide programme, RECYKLOBOXU, in 2008. Under the banner 'Batteries in the right place' (Baterky na správnom mieste) educational programmes and collection competitions are run in schools. Information is provided on the website **Small batteries**. New projects are under development.

Asekol

- **Collection boxes and public campaigns:** Collection boxes are available for both small WEEE and batteries. **Booths are setup in public places on special days, such as 'European recycling day' and at trade fairs.**

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM reporting requirements under the Recycling Fund follow the chemistries of the EWC codes. Batteries with a weight of up to 1 kg are considered portable, those above 1 kg are regarded as industrial batteries. POM volumes are subject to potential errors due to missing or incorrect reporting of batteries integrated into EEE.

Collection data: Data on portable battery units, their chemistry and industrial batteries were not collected prior to 2014. Data accuracy can be expected to improve further after the entry into force of the new Waste Act in 2015.

Potential for improving collection rates

The legal framework for the application of extended producer responsibility on battery producers will only be in place once the planned amendment of the Waste Act will come into force, probably in late 2015.

SLOVENIA

Key points

- Since 2003, municipalities have been obliged to separately collect hazardous wastes including batteries. They remain responsible for financing their collection infrastructure. In 2008 and 2010, Decrees transposing Batteries Directive 2006/66/EC required individual producers of separately sold batteries to achieve collection targets by taking back waste batteries from retailers, municipalities and their own collection points through approved waste management plans. Producers of EEE with integrated batteries do not need a separate waste management plan for batteries, but comply through their WEEE management plan. Three WEEE organisations, ZEOS, Interseroh and Slopak offer 'joint' battery management plans that were approved in November 2009.

- Collection increased quickly from 5 g per capita in 2009 to 125 g in 2011. In 2011, POM decreased -57%, resulting in a peak of the collection rate peak of 33% in 2012. **In 2013 and 2014, the collection volume decreased (-20%, -9%,) while POM remained nearly constant, causing the collection rate to move down to 29% in 2014.**

- Potential for improving collection rates lies primarily in increasing the density and visibility of collection points by imposing more specific requirements on retailers and municipalities.

Regulatory parameters

Overview

Since 2003 municipalities have been obliged to separately collect hazardous wastes including batteries, and to finance collection infrastructure. A **Decree of July 2008** transposed Batteries Directive 2006/66/EC and required producers of separately sold batteries to comply with the take-back obligation through approved waste management plans. This was replaced by a **Decree in January 2010** which *inter alia* postponed the deadline for submitting the plans to the end of March 2010 and extended the plan requirement to industrial batteries. An 2012 amendment allowed the export of waste batteries. **In 2015, a new Waste Regulation i.a. revised reporting requirements for collectors and processors and a new WEEE Regulation notably requires compliance organisations ('holders of producers' joint plans') to carry out WEEE management with a not-for-profit objective and compensate municipalities for their costs of collection. These provisions have not been applied to batteries legislation but may affect batteries producers as the 'joint plans' for batteries and WEEE are held by the same organisations.**

Roles and responsibilities in waste portable battery collection

- **Producers of separately sold batteries** must finance management of waste batteries. They must achieve the 25% and 45% collection targets in 2012 and 2016 respectively. They must comply through an individual or joint waste management plan and cannot transfer their legal obligations to a third party.

- **Producers of batteries integrated into EEE** do not need to finance the waste management of separately collected batteries but also need to comply through an approved batteries waste management plan.

- **Organisations** (referred to as 'holders of joint waste management plans') have administrative obligations only.

- **Municipalities** must collect dangerous waste, including waste batteries, from households. They must finance the collection infrastructure themselves.

- **Retailers** must take back batteries free of charge without obligation to purchase.

The market share of collected waste portable batteries was calculated by the Environment Agency for the first time in June 2010 for the year 2009. POM data was available from the customs authority from January 2009.

Requirements on compliance organisations

A 'holder of a joint batteries management plan' must report to the Ministry.

Development of compliance organisations

Around 250 battery producers comply through three joint battery management plans, approved in November 2009 and held by two WEEE organisations and the Green Dot packaging organisations:

- **ZEOS**, founded on 20 July 2005 by several large EEE producers, including Gorenje and BSH. Its share of the market is around 55%[172]. ZEOS began battery collection during 2010 from retail chains Mercator, Big Bang, Merkur, OMV and Telekom.
- **Interseroh**, the Slovenian subsidiary of the German waste management provider, was approved in December 2004 as a organisation for B2B packaging, and in mid-2007 as a organisation for B2C and B2B WEEE. It's market share is about 45%.
- **Slopak**, the packaging compliance organisation, represents a very small market share of battery producers.

Clearing for over- and under-collection

Collection targets apply to each producer. No clearing required.

Interface with WEEE organisations

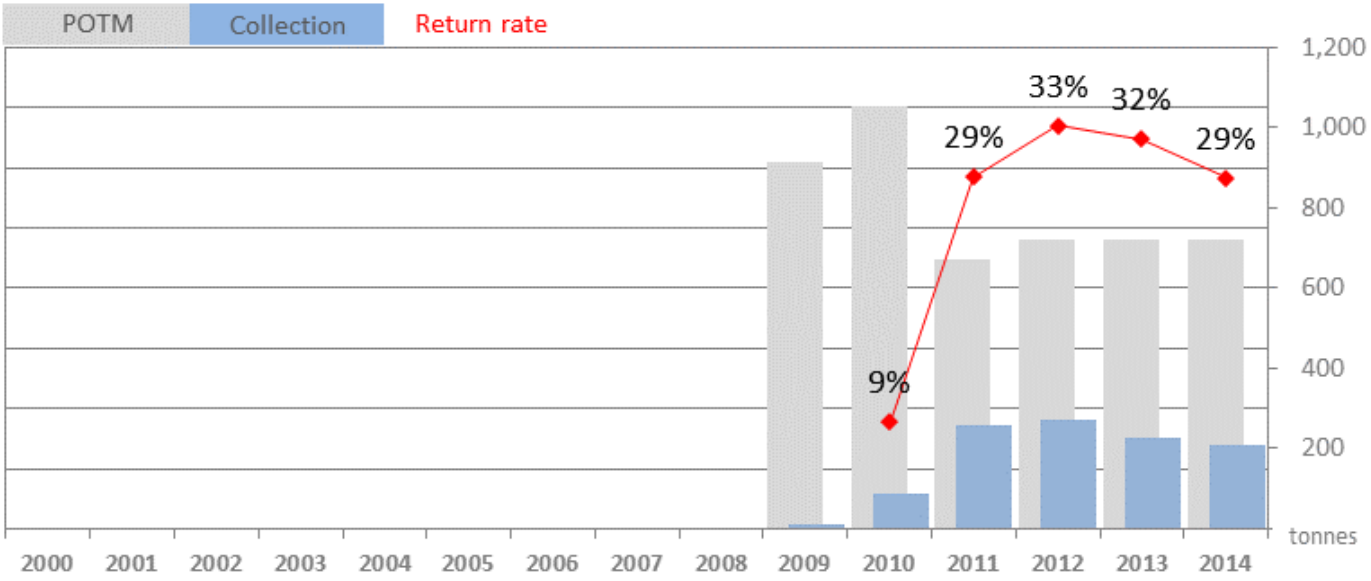
All organisations offer both joint WEEE and waste batteries waste management plans.

[172] In 2010 ZEOS collected about 22 g per capita and Interseroh an estimated 15 g per capita.

Collection results

In 2006 municipalities collected around 50 g per capita of alkaline and 110 g of other waste batteries, including lead accumulators.

Collection through the approved battery waste management plans increased quickly from 5 g per capita in 2009 to 125 g in 2011. In 2011, POM dropped 36%, letting the collection rate peak at 33% in 2012. **In 2013 and 2014, collection fell by -16 and -8%, while POM remained nearly constant, causing the collection rate to drop to 29% in 2014.**



Source: ***Republic of Slovenia Statistical Office***

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are an estimated 3,000 waste portable battery collection points in Slovenia, or one for every 700 residents:

Number of collection points and share of collected batteries, estimate 2012:

Collection point host	***Number of collection points***	***Share of total waste battery collection (ZEOS only)***
Retailers serviced by organisations	2,500	32%
Municipalities	100	8%
Schools	400	19%
Companies		33%
WEEE dismantlers		3%

Source: No of collection points: own estimate; Share of waste batteries: ZEOS

Consumer awareness creation

Supporting legal requirements

Producers/organisations must provide details of communication measures in their waste management plans. There are no legal requirements regarding minimum spending for awareness creation.

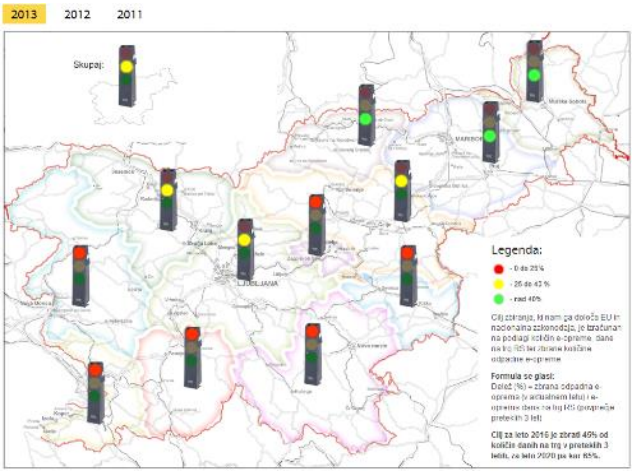
ZEOS

- **Collection boxes:** In addition to cardboard collection boxes, larger containers are available for small WEEE, lamps and batteries in consistent shapes.


- **Campaigns:** ZEOS' LIFE campaign is organised in collaboration with Life+ to promote awareness of WEEE and battery collection. The campaign ran from October 2011 to September 2013 and in 2014. It is aimed at young people up to 20 years using all media except TV. Competitions and educational events are organised for schools.

  A special feature of the campaign is the 'E-Transformer' truck (YouTube) in which recycling of e-waste is explained. Schools can book visits of the E-Transformer. Another feature increasing the competitive spirit of those participating in the campaign is a map of Slovenia which shows each region's progress in reaching the collection targets for WEEE by way of traffic lights in the form of ZEOS collection containers (here).





Interseroh

- **Collection containers** in different formats (**more info**)

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

Free-riders

POM reports must be broken down into primary and secondary batteries and chemistries. As batteries in EEE are reported under different waste plans, free-riders can also be clearly distinguished. Nevertheless, challenges are seen in accounting for them separately as most producers are importers with limited information on detailed product specifications. The customs authority plays a key role in **enforcement** as it identifies importers and charges an 'environmental tax' on imports, which – at about only EUR 8 per tonne of portable batteries placed on the market – finances the operations of the Ministry's battery producer register, but not recycling.

Collection reports under the battery waste plans must distinguish between primary and secondary batteries but not chemistries. As elsewhere, the distinction between waste portable and waste industrial batteries is a challenge. There has been no enforcement action by authorities as yet.

Potential for improving collection rates

The density and visibility of collection points could be increased by more specific requirements on retailers and municipalities.

As municipalities are obligated to collect waste batteries and finance the collection themselves, incentives or targets for municipalities to maximize collection could increase the collection rate.

Moreover, the monitoring of waste battery material flows could be facilitated by additional requirements for collectors, such as regular sampling of the mixed municipal waste.

SPAIN

Key points

- Royal Decree 45/1996 held the Autonomous Communities responsible for separately collecting waste batteries. Royal Decree 106/2008 transposing Batteries Directive 2006/66/EC made producers responsible for taking back waste batteries and left each Autonomous Community responsible for authorising organisations operating on their territory. Decentralisation of authority slowed the implementation of producer compliance organisations and complicates waste flow monitoring. Though the legal framework for simplified requirements has been in place since 2012, these have yet to be fully implemented through an amendment to the Batteries Decree. **In 2015 a new WEEE Decree extended EEE reporting and take back obligations to 'batteries that the end-user cannot manually remove from WEEE'. The (unknown) POM weight of these batteries is reflected in the WEEE collection target calculation.**

- Producers comply through battery organisation Ecopilas, set up in 2000 by electronics association Asimelec. WEEE organisations, notably ERP, have also offered compliance services since 2009.

- Unofficial data suggest that the collection rate increased from 34% in 2012 **to 39% in 2014.** After a strong decline of POM between 2010 and 2012, POM **increased by 9% in 2014 to 235 g per capita. The collection volume has increased by an annual average of about 6% since 2010 to 87 g per capita in 2014.**

Regulatory parameters

Overview

Royal Decree 45/1996 held Autonomous Communities and local authorities responsible for separately collecting waste batteries. **Royal Decree 106/2008** transposing Batteries Directive 2006/66/EC made producers responsible for taking back waste batteries and left the 19 Autonomous Communities responsible for authorising compliance organisations. Decentralisation of authority created severe challenges for the implementation of national compliance organisations, for example by complicating the aggregation of reliable waste collection data on the national level. A **March 2010 amendment to the Batteries Decree** partly solved this issue by requiring collective organisations to report collection data to a central register as well as to the Autonomous Communities.

The **2011 Framework Waste Management Law** established a much needed national Coordination Committee on Waste which brings together members of the 19 Autonomous Communities to implement waste policies more effectively. A **May 2012 amendment** to the new waste law greatly simplified authorisation requirements for collective organisations by making the authorisation in their home region valid for the entire national territory. However, these simplified requirements have yet to be implemented through an amendment to the Batteries Decree.

A new WEEE Decree, in force from February 2015, extended EEE reporting and take back obligation to 'batteries that the end-user cannot manually remove from WEEE'. Though the EEE POM report must state 'weight of battery included'. The battery weight does not need to be specified. The producer – under his WEEE, not batteries, obligations – must finance the waste management of these batteries[173]. The (unknown) POM weight of these batteries is reflected in the WEEE collection target calculation.

[173] **This implies that producers of EEE containing non-removable batteries are not subject to registration, reporting and financing requirements under the Batteries Decree**

Roles and responsibilities in waste portable battery collection

- A **national network of collection points** distributed according to population density must accept waste batteries free of charge from consumers and may share collection points with WEEE organisations. Collection points do not need to be authorised.

- **Local authorities** may organise temporary storage and transport to treatment centres (public management organisations for batteries).

- **Producers** are at least responsible for waste batteries from temporary storage onward[174]. They can comply by participating in a public or collective management organisation[175] and must finance public information campaigns approved by the Autonomous Communities.

- **Collective organisations** must be approved as integrated management organisations by each Autonomous Community in which they operate. (An amendment to the Batteries Decree will make the authorisation in the home region of a organisation valid for the entire national territory).

- On a national level the **collection targets** (25% by end 2011, 45% by end 2015, deviating from the Directive) are not directly applied to producers, but the Autonomous Communities must control and report achievement of collection targets to a central authority and may require producers to reach higher targets.

- **Retailers** must take back batteries free of charge only if a new battery is purchased.

Requirements on compliance organisations

Organisations are subject to strict authorisation and monitoring requirements. However, as each of Spain's 19 Autonomous Communities is charged with these tasks, their implementation varies. Authorisations are valid for up to 5 years, renewable, and require organisations *inter alia* to

- have a not-for-profit character;
- enter into agreements with the municipalities or governments of Autonomous Communities which define conditions for collection, storage and treatment;
- describe their financing mechanism and control mechanisms for operation and data verification, as well as procedures of data collection and validation;
- guarantee solvency, e.g. through a report from a financial institution, proof of insurance against professional risk, presentation of annual accounts or other documentation considered sufficient by the Autonomous Community;
- be audited annually by an independent party to monitor the degree of fulfilment of the obligations if stipulated by regulations of the Autonomous Communities.

[174] Collection, storage and transport must be free for the 'holder' or end-user. The definition of 'holder' does not include municipalities. Producers are therefore not required to fully finance public collection organisations.

[175] Producers of portable batteries may not comply through an individual organisation (though producers of industrial or automotive batteries may do so)

Development of compliance organisations

Not-for-profit company **Ecopilas** was set up in 2000 by electronics association Asimelec. It represents producers placing on the market about 75% of all separately sold portable batteries. Since 2012, it has been part of ASIMELEC's '**Recyclia**' platform that unites three WEEE organisations Tragamovil, ECOASIMELEC and Ecofimatica.

Since 2009, three other WEEE organisations have also offered compliance services to producers: **ERP**, **EcoRAEE** and **Ecolec**. EcoRAEE and Ecolec only manage waste batteries removed from WEEE they collect.

In 2014, Ecopilas share of POM is around 64% and its share of collection about 60%. ERP – whose members include Duracell – contributes about 34% to POM and 39% to collection.

Interface with WEEE organisations

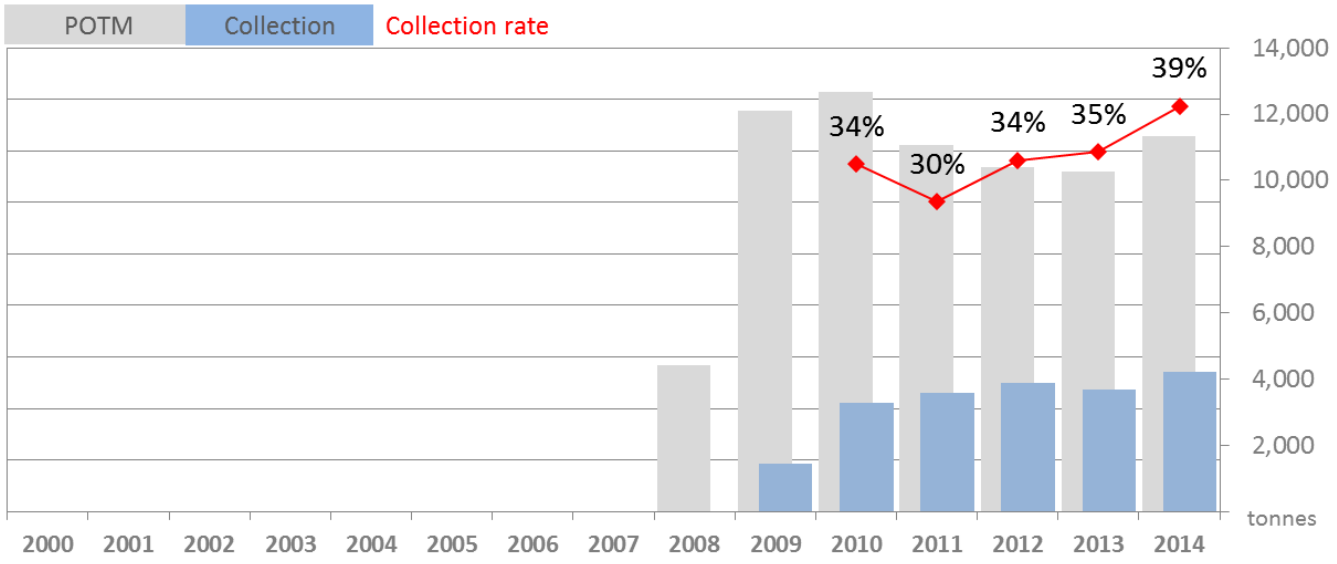
The remaining WEEE organisations (**ECOTIC**, **ECOLUM**, **Ecoasimelec**, **Ecofimatica**, **Tragamovil**) have agreements with Ecopilas, whereby the WEEE organisations' members become members of Ecopilas, but all administration is handled through the WEEE organisations.

Clearing for over- and under-collection

To improve the effectiveness of informational and educational measures and coordinate collection, Ecopilas, with ERP, constituted a voluntary coordination centre, **OfiPilas,** in 2011. OfiPilas offers end-users a **collection point locator**. For participating municipalities, the site offers a management tool for coordinating collection and transportation. Ofipilas does not seem to have been widely used. It may follow the pattern of the voluntary WEEE clearing house **OFIRAEE** which was set up in 2007 by the largest WEEE organisation and whose wider adoption by other organisations only began in 2011/2.

Collection results

Officially confirmed national collection data are not available. The organisations' reports suggest that a collection rate of 34% in 2012 **increasing to 39% in 2014.** By 2013, POM had decreased by 21% compared to 2010 following the economic crisis. **By 2014, the trend had reversed as POM increased 9% to 235 g per capita. The collection volume has increased by an annual average of about 6% since 2010 to 87 g per capita in 2014.**



Source: Estimates based on incomplete data from compliance organisations

Drivers affecting the collection rate

Availability of collection points and use of collection channels

We estimate that there are close to 28,000 waste portable battery collection points in Spain, or one per 1,700 residents.

Ecopilas' network of collection points grew from about 16,000 in June 2012[176] to 21,000 in 2013, largely due to its collaboration with WEEE organisations under the Recyclia platform. In addition, it takes back waste batteries from 2,700 municipal collection points. About 1.3 million 'mini-collection containers' have been distributed to Spanish households as a collection and educational tool.

ERP and other organisations have not released their respective numbers.

Number of collection points and share of collected batteries, estimate 2012:

Collection point host	*Number of collection points*	*Share of total waste battery collection*
Retailers serviced by organisations	20,000	Not available
Municipalities	3,000	
Schools	2,500	
Companies		
WEEE dismantlers		

Source: Own estimate based on partial organisation data

Consumer awareness creation

Supporting legal requirements

- **Public authorities and organisations** must provide consumers with the information specified in the EU Directive.
- **Distributors** must inform consumers about the possibility of returning batteries
- **Producers** must inform consumers or end-users that waste management costs are included in the sale price but may not show these costs separately on invoices to end-users

[176] Earlier data: Ecopilas collection points increased from around 4,000 in March 2009 to 12,000 in October 2010. At that time Ecopilas had been approved in 9 of the 19 Autonomous Communities. Most containers were located in Catalonia, Madrid, Valencia and Andalusia.

Ecopilas

- **Collection boxes:** Collection containers are available as 20 kg cardboard boxes, 25 kg polycarbonate canisters and 40 kg plastic cylinders. Drums and containers are also available for industrial batteries (**link**). Collection boxes are accompanied by informational material**.** Collection box locations are shown on **Googlemaps**. **In 2014 a pilot project tested 'minipuntos' in several towns allowing residents to dispose of waste batteries and other waste streams.**


minipunto

- **'School of Recycling' campaign**: The 'School of Recycling' is a mobile 120 square meter classroom in a truck equipped with audiovisual materials explaining the importance of recycling WEEE and batteries, designed to stimulate the curiosity and imagination of 10-14 year old students. The schools campaign is accompanied by training for teachers. Since its launch in late 2011, the campaign has reached over 40,000 students and 1,400 teachers from ten Autonomous Communities. The campaign is organised by the Recyclia WEEE organisation in collaboration with regional authorities.

- **Sponsoring:** In 2013 **and 2014**, Ecopilas sponsored riders in the Tour of Spain cycle race, 'La Vuelta'. The team wore green shirts bearing the Ecopilas logos. In 2014, extended promotions to the 'Almirante Conde de Barcelona' Regatta.


- **Social media:** Ecopilas on Facebook. **In May 2015 the 'MalagaRecicla' campaign encouraged people to take selfies while disposing of batteries and uploading the photos to Instagram with random spot prizes offered.**

ERP Spain

- **Collection boxes:** Various formats are used.



- **Public awareness campaigns:** ERP Spain, together with Lorca municipality, launched a one-day batteries awareness campaign in December 2012. The campaign consisted of collection and information booths set up in public places such as shopping malls, to educate the public on battery recycling and to collect obsolete batteries.

- In February 2014, ERP co-organised the "Recycle batteries and run" in Barcelona together with Catalan agencies and ADEAC, an association for environmental education, with the objective of raising public awareness.

Consumer awareness and disposal behaviour

No surveys have been released.

Accuracy of reporting

POM: The central government's **register of battery producers** provides for data on EEE and battery volumes placed on the market that allow the organisations to calculate their market share of batteries. However, the market shares claimed by the organisations do not appear to fully add up.

Enforcement: The mandatory requirement that battery producers show the recycling fee paid to a organisation for each unit on the sales invoice to distributors[177] should have facilitated enforcement. In practice this provision seems to have been rarely enforced. As regards WEEE, enforcement activities have been almost exclusively initiated by the WEEE organisations[178]: by February 2007, about 500 potential free-riders had been notified to the authorities. The Ministry of Industry and the Autonomous Communities of Madrid, Catalonia and Murcia have notified affected producers and fined some of them.

Collection data are less certain: WEEE and battery organisations' collection operations often predated authorisation in an Autonomous Community. For these collection volumes, there is thus no official verification and the organisations have found it difficult to agree on the WEEE volumes they claim to have collected. The same can be assumed to apply to collected waste batteries. While the Autonomous Communities must report volumes to the Central Government, the submission of these data appears subject to significant time lags.

177 The fee must NOT be shown on the invoice issued to end-users.

178 In October 2006, WEEE organisation ECOLEC and a number of producer associations set up ORPAEE (the Observatory of the Registry of EEE Producers). ORPAEE estimated that EUR 15 million of visible WEEE fees were fraudulently kept by retailers and unregistered producers, out of an estimated total of EUR 180 million charged. In early 2008, ECOTIC launched its own monitoring campaign and reported over 100 non-complying producers to the authorities in several Autonomous Communities. 2009 monitoring activities focused on distance sellers selling to Spanish end-users from other member states.

SWEDEN

Key points

- Following the **1997 Batteries Orde**r, all of Sweden's 290 municipalities had to set up their own battery collection while producers of certain hazardous batteries financed these organisations through fees paid into a recycling fund managed by environment agency SNV. **Batteries Ordinance 2008:834** transposed Batteries Directive 2006/66/EC, and from January 2009 de facto shifted the collection responsibility to producers. They fulfill their obligation through WEEE organisation El-Kretsen. In 2012, El-Kretsen received 70% from the municipal collection points. Notably, retailers are not obliged to take back waste batteries.

- Data released by SNV's battery register in September 2014 show that the collection rate increased every year from about 27% in 2009 to 64% in 2013. **El Kretsen's battery collection rate was 56% (2013: 60%, as POM increased by 8%).**

- While Swedish consumers appear to be largely familiar with disposing of batteries at municipal collection points, a higher density of collection points, for example by obligating certain retailers to take back waste batteries or better coordination between the organisations for battery and WEEE collection, could improve return convenience and potentially increase collection volumes.

Regulatory parameters vg

The **1997 Batteries Orde**r made municipalities responsible for waste battery collection and financed these activities through a fee paid by battery producers into a **recycling fund** managed by the Swedish Environmental Protection Authority (SNV). **Ordinance 2008:834** transposed Batteries Directive 2006/66/EC, repealed the 1997 Order[179] and de facto passed responsibility for collection to producers from January 2009. However, SNV did not issue guidance on collection organisations or on information requirements, as required by the new Ordinance, until September 2009. Sweden's 2012-2017 Waste Plan includes a proposal to investigate the possibility of introducing economic instruments on mercury-containing batteries, similar to those still in place for sealed nickel-cadmium batteries.

Roles and responsibilities in waste portable battery collection

- **Producers** must take back waste batteries by establishing one or several collection organisations. Small producers (e.g. those placing on the market less than 50 kg of non-hazardous batteries) are exempt from the take-back (but not the reporting) obligations.
- **Municipalities** are no longer responsible for collection but must enable and consult with producers to establish adequate collection points.
- **Retailers** have no take-back obligation.
- Collection **organisations** must ensure appropriately located collection points, taking into account expected end-users of batteries, population density and other circumstances, and must agree with municipalities on the use of municipal collection organisations. WEEE organisations are considered appropriate organisations for batteries included in WEEE.
- There is a **collection target** (on the basis of the current year POM) of 65% by 2012 and 75% by 2016, far above the 45% required by the Batteries Directive. The responsibility for achieving the target is not defined.

[179] Batteries Ordinance 2008:834 maintains recycling fund fees only on cadmium batteries (less than 0.002% cadmium allowed). At about EUR 30,000 per tonne, the fee is intended to discourage the use of these batteries.

Requirements on compliance organisations

The Swedish statutes do not define compliance organisations and while SNV's remit covers producers, it does not extend to compliance organisations for waste from households. In consequence, there are no approved organisations. However, SNV is in a continuous dialogue with the organisations to evaluate and adjust their operations, a practice SNV refers to as 'Development by Dialogue'.

Development of compliance organisations

In response to the 1997 Batteries Order, the Swedish Environmental Protection Authority (SNV) created the initiative **Batteriinsamlingen** (Battery Collection) in 1997 in cooperation with the predecessor of the Swedish Association of Local Authorities and Regions (**SKL**), waste management association **Avfall Sverige** and the battery producer association **Batteriföreningen**: Sweden's 290 municipalities had each set up their own battery collection organisations while producers of certain hazardous batteries financed these organisations through fees paid into a recycling fund managed by SNV.

Following the 2008 Battery Ordinance, WEEE organisation **El-Kretsen** assigned to take back batteries collected by the **Batteriinsamlingen (since 2014: Batteriåtervinningen)** initiative. Around 800 battery producers comply through El-Kretsen (set up in 2001 by 21 trade associations). Battery fees are only charged on separately sold batteries. Integrated batteries are covered by the WEEE fee, thus ensuring that producers of integrated batteries do not pay twice for collection.

In addition, some of the 200 **individual producer organisations** for B2B EEE also cover integrated batteries. These individual organisations do not require separate approval for batteries as the Ordinance considers WEEE organisations to be appropriate organisations for batteries included in WEEE.

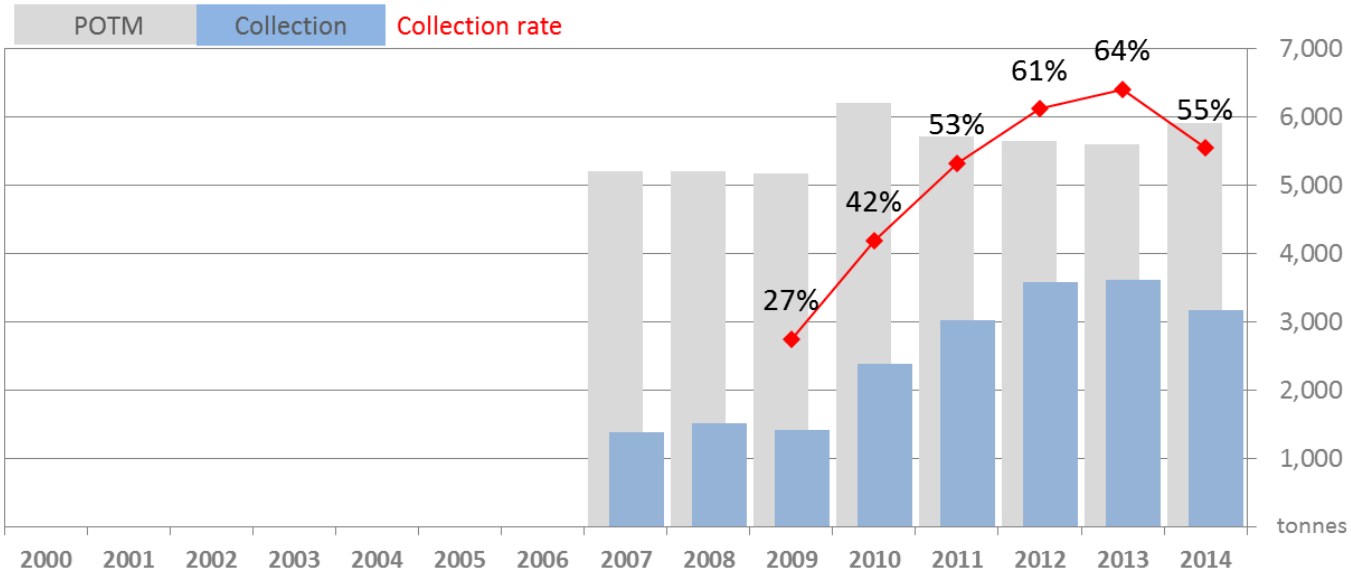
Interface with WEEE organisations

El-Kretsen retains its status as a quasi-single WEEE (and thus battery) organisation. Although a second WEEE organisation (EAF - Elektonikåtervinning förening) was set up in 2007, the clearing between the organisations appears to have been agreed privately between themselves by 2010. SNV considers the clearing process to be a bilateral affair between the two organisations and does not provide POM or collection data.

Collection results

Data released by SNV's battery register in September 2014 show a constant increase of the collection rate from about 27% in 2009 to 64% in 2013 (a world record of about 380 g per capita). Nominal collection volumes also increased strongly until 2012. **SNV data for 2014 are not available.**

El Kretsen data show a collection rate of around 59% in 2012 and 2013, while the nominal collection volume decreased 5% over the previous year. **In 2014, El Kretsen recorded a POM increase of 8%, and a collection decrease of -3%, leading to a collection rate of over 55%.**



*Source: **2014 El Kresten data**; Before: SNV September 204;*

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are around 10,000[180] waste portable battery collection points in Sweden, or about one per 970 residents. The implementation of the WEEE Recast Directive will introduce the retailers' obligation to take-back WEEE in Sweden. This is also likely to increase the number of collection points for portable batteries.

Number of collection points and share of collected batteries, estimate 2012 (remained constant in 2013):

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers	2,379	10%
Municipalities	6,000	70%
Schools	0	0
Companies		5%
WEEE dismantlers		15%

Source: El Kretsen

[180] El Kretsen Annual report 2011

Consumer awareness measures

Supporting legal requirements

Producers are responsible for awareness creation measures; if appropriate the information is to be provided through the municipalities.

El-Kretsen / Batteriatervinningen 'battery recycling' (previously: Batterinsamlingen 'battery collection')

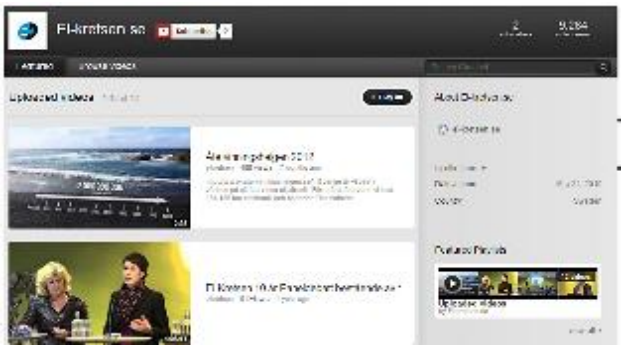
- **Collection boxes:** 70% of batteries are collected by municipalities in non-branded containers. In early 2013, El-Kretsen launched a pilot project to collect small WEEE, lamps and batteries in one container with sections for each fraction. In one area of Stockholm, El-Kretsen is also conducting a campaign which distributes paper collection bags for re-usable batteries to households. Full bags are returned to a mobile collection truck that tours the area periodically. The bags contain information on different options for disposal, including the option of subscribing to an SMS service which sends reminders when the truck is close to their address.

- **Public awareness campaigns & advertising:** With the support of municipalities, El-Kretsen, regularly conducts collections which are publicised by newspaper/magazine advertisements and posters on display in public areas. El-Kretsen and lead battery organisation **BlyBatteriRetur** cooperated under the brand Batterinsamlingen to strengthen their public awareness campaigns. The organisation's main function is to conduct public awareness campaigns and events. In 2010 El-Kretsen launched a battery collection competition between 7 colleges/universities.

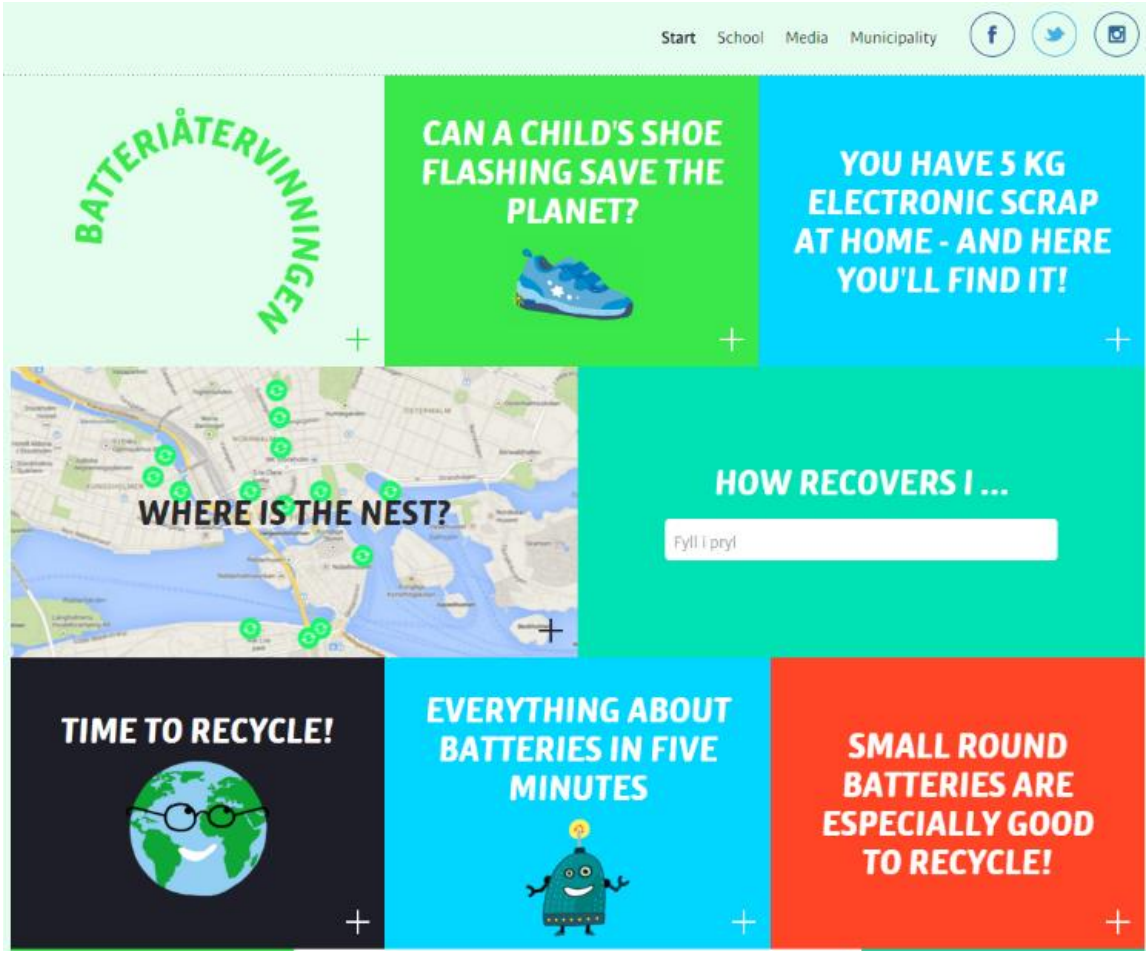
  A series of short humorous television commercials were launched in early 2014 to encourage households to dispose of obsolete batteries. In 2015 as part of an outdoors public transport campaign, new posters and advertisements were placed in subway stations (as well as inside trains) and bus stops.

2015:

- **Social media:** El-Kretsen has developed apps for mobile phones (available for both android and iPhone platforms) that give details of recycling points within the vicinity, their opening hours and also useful facts, fun trivia and games. Educational videos are provided through **YouTube and updates on campaigns through their Facebook page and twitter page**.



ww.batteriatervinningen.se:



Consumer awareness and disposal behaviour

Environment agency SNV has been monitoring public attitudes to the collection of batteries over the last decade:

- Consumer awareness of the need to avoid disposing of batteries with household waste increased to 74% in 2010 from 64% in 2008 (for WEEE, awareness is only 34%). Awareness of battery information campaigns remained at 51%.

- In the same year, 74% of municipalities indicated that there was a need for more information about the collection organisations for WEEE and waste batteries. Only 12% considered the information they got from the organisation adequate, with large cities being the most dissatisfied.

Accuracy of reporting

POM must be reported by chemistries.

- **Batteries integrated in EEE** are identified and not subject to separate fees. Audits of POM reports are carried out by El-Kretsen.

- **Lead acid:** Producers of industrial batteries weighing less than 3 kg must de facto join El-Kretsen[181]. El-Kretsen can thus ensure that lead acid batteries are properly classified as industrial or portable batteries. SNV's September 2014 data show a return rate for lead portable batteries of 76% in 2010, increasing to 112% in 2013. El-Kretsen data show a 90% return rate in 2013.

Collection volumes must be reported by **c**hemistries only. The low share of batteries removed from WEEE suggests that there are reporting errors or that valuable batteries are being treated outside the El-Kretsen organisation.

Enforcement actions against free-riders and incorrect reporting have been taken by the authorities. A 2012 Order on environmental Fines (2012:259) introduces a fine of SEK 10,000 (EUR 1,195) for late reporting of EEE/WEEE and batteries – independent of the volumes to be reported.

Potential for improving collection rates

While Swedish consumers appear to be largely familiar with disposing of batteries at municipal collection points, a higher density of collection points – for example by obligating certain retailers to take back waste batteries or by better coordination between the organisations for battery and WEEE collection – could improve return convenience and potentially increase collection volumes.

[181] Producers of industrial batteries above that weight can join Blybatteriretur or comply individually.

SWITZERLAND

Key points

- Legal requirements for the take-back of batteries have been in force since 1986, and voluntary financing by producers began in 1991. A **2001 Ordinance** made the financing obligation mandatory through an Advance Recycling Fee (ARF) and a **2010 revision** aligned the Ordinance with Batteries Directive 2006/66/EC. Since 2001, the Government-appointed battery organisation INOBAT has been authorised to grant producers exemptions from the financing obligation. INOBAT mainly collects waste batteries from voluntary municipal collection points and obligated retailers. Producers of batteries in EEE do not need to join INOBAT and comply through the two voluntary WEEE organisations who report battery volumes to INOBAT.

- A collection rate of well above 60% has been achieved since 2000 (**2014: 71%**). **In 2014, POM increased by 9% to about 495g, the collection volume by 8% to 338 g per capita, both all-time highs.** The high collection rate is supported by comparatively low POM volumes which may not fully reflect the volumes of batteries POM in EEE: **Though the share of built-in-batteries in 2014 was increased to 20% of the portable battery POM (2013: 16%; 2012: 15%) it is still somewhat lower than data from other countries suggest.**

- The comparatively low collection point density could be improved by tighter coordination of collection with the WEEE organisations and an obligation on municipalities to collect batteries.

Regulatory parameters

Overview

Switzerland is not a member of the EU or the EEA. Legal requirements for the take-back of batteries have been in force since 1986 and voluntary financing by producers began in 1991. The **April 2001 Ordinance** on the reduction of risks in dealing with certain particularly dangerous substances, preparations and articles (ORRChem) made the fee mandatory for portable batteries. Since July 2006 the fee has also applied to lead batteries weighing less than 5kg.

A **2010 revision of the Ordinance**, in force from February 2011, aligned the Ordinance with Batteries Directive 2006/66/EC and extended reporting and financing obligations to all battery types and weights. An appointed private organisation (INOBAT) collects producers' data and is authorised to grant exemptions from the financial obligation.

Roles and responsibilities in waste portable battery collection

- **Producers of separately sold batteries** (or sector organisations including the 2 Swiss WEEE organisations) must report volumes put on the market to the government-designated organisation INOBAT and pay the Advance Recycling Fee (ARF). The amount of the fee is set by legislation[182] at (currently) CHF 3.20 (EUR 2.6) per kg for portable batteries and CHF 1 (EUR 0.8) per unit for lead batteries (though the fee actually charged for different battery sizes and chemistries varies).

- **Producers of batteries integrated into EEE** comply through voluntary WEEE organisations SWICO and SENS. The ARF does not apply to batteries built into equipment (SWICO and SENS' fees include any costs of battery recycling).

- **INOBAT** was again designated by the Government to manage the ARF for the period 2011-2015. To increase collection, INOBAT may spend up to 25% on information campaigns (before 2011: up to 15%). The price INOBAT

[182] Ordinance on the Amount of the Advance Recycling Fee, 1999, revised 2011

must pay to the only **recycler**, BATREC, is also set by the Government, at CHF 4,000[183] (EUR 3,316) per tonne until the end of 2014. In 2013, BAFU agreed to drop the legally mandated fee and a fee of CHF 3,520 (EUR 2,918) has been agreed between INOBAT, Batrec und BAFU from 2016.

- **Retailers** (distributors) of batteries must take back waste batteries from consumers and hand them to INOBAT.
- **Municipalities** are not obligated to collect [but do so in practice].

Requirements on compliance organisations

Environment agency BAFU assigns ONE appropriate private entity (INOBAT) to raise and administer the ARF. This entity may not be commercially involved with the production, import, sale or treatment of batteries. Its operating contract is for a maximum of 5 years and its main focus is to regulate the administrative expenses of the organisation.

Development of compliance organisations

Since 1986 there has been a statutory requirement for manufacturers and distributors to collect all types of battery free of charge. This was originally intended to prevent mercury emissions from waste incinerators, and battery waste was exported to a special landfill site in East Germany. In 1991, Swiss battery treatment facility BATREC became operational to allow the recovery of metals, and the export of spent batteries was banned.

In 1991, a private organisation, BESO (Batterieentsorgungs-Selbsthilfeorganisation), was set up to manage collection and processing. Its members were manufacturers and importers of batteries and products using batteries, large distributors and the department stores association. BESO decided to introduce an 'Advance Recycling Fee' (ARF) to finance its activities. There was no regulatory framework underpinning this fee, so it was 'voluntary'. From April 2001 it became mandatory for certain batteries containing hazardous substances to secure the increased funding needs of the local recyclers.

In 2001 BESO was renamed **INOBAT** (Interessenorganisation Batterieentsorgung) and its statutes were amended to enable it to administer the ARF on behalf of the Government. Its mandate was extended for a second five year period, from 1 January 2006 to 31 December 2010 and for a third five year period (to end of 2015) in April 2011.

550 producers are obliged to pay the ARF and report to INOBAT. 136 of them are INOBAT members.

Clearing for over- and under-collection

Not required as there is only one organisation.

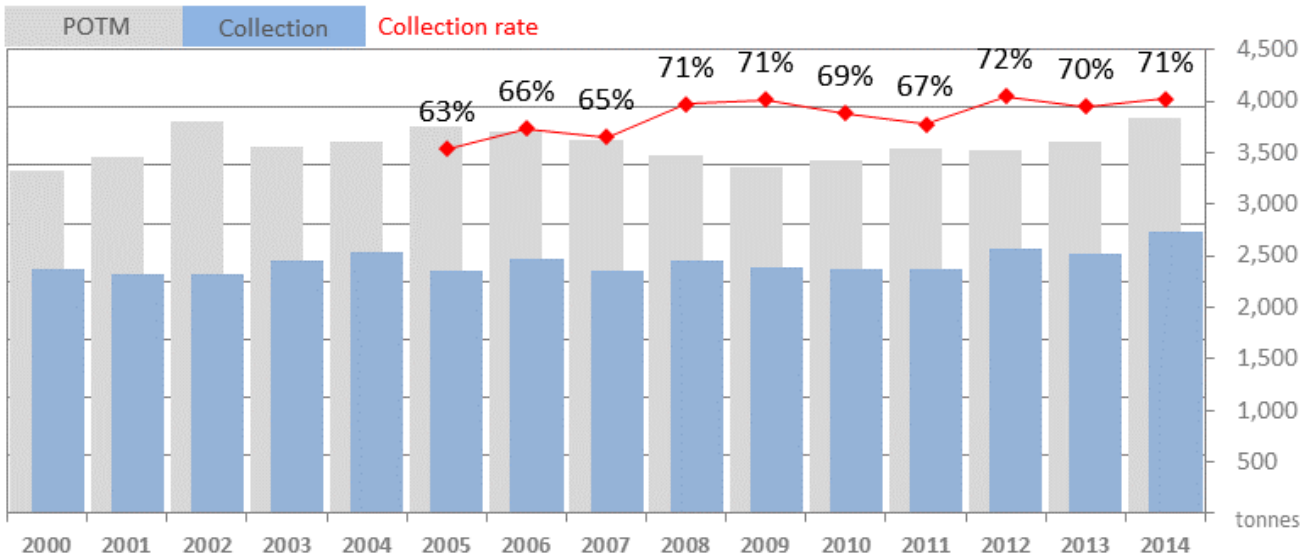
Interface with WEEE organisations

Producers of EEE with integrated batteries need not join INOBAT if they are members of sector organisations (i.e. SWICO and SENS) that themselves have an agreement with INOBAT.

[183] Before 2013: CHF 4,400

Collection results

A collection rate[184] well above 60% has been achieved every year since 2000. **In 2014, POM increased by 8% to 495g, the collection volume by 8% to 338 g per capita, both all-time highs.** The high collection rate is supported by comparatively low POM volumes which may not fully reflect the volumes of batteries POM in EEE: **Battery volumes reported by WEEE organisations SWICO/SENS contributed 20% of the portable battery POM volume in 2014** (2013: 16%; 2012: 15%), compared to around 30% elsewhere.



Source: Inobat

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are about 12,000 waste portable battery collection points in Switzerland, or one for every 660 residents. In 2012, about 25% of INOBAT's collection volumes derived from 11,000 obligated retailers, about 25% from companies and WEEE dismantlers and about 50% from voluntary collection by municipalities and other entities (2010: 65%). INOBAT notes that the 2012 collection volume was probably higher, but voluntary collectors, including municipalities, are holding back collected batteries to benefit from INOBAT's revised compensation structure, which pays out more per kg the more waste batteries are returned. This would cause some municipalities to store batteries for up to 2 years[185].

Number of collection points and share of collected batteries, estimates 2012:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers and voluntary collection centres serviced by INOBAT	11,000	25%
Municipalities	1,000	50%
Schools	0	0%
Companies		20%
WEEE dismantlers		5%

[184] POM volumes (and the collection rate shown here) reflect the average of the current and the preceding year.

[185] Up to 2010, INOBAT picked up batteries from collection points free of charge once 50 kg had been collected. Small retailers who did not reach this volume had to return batteries by mail.

Source: Own estimates derived from INOBAT data

Consumer awareness creation

Supporting legal requirements

Retailers must clearly indicate at POS that

- spent batteries must be returned to a sales point or to a designated collection point;
- the sales point takes back spent batteries;
- there is a fee on batteries which finances their collection and treatment.

A requirement for advertisements of batteries to mention the return obligation was lifted in 2012.

INOBAT

- **Collection boxes:** Inobat operates on **online shop** where collection point hosts can order collection and promotional materials such as posters and stickers. Most items except for plastic drums are free.



Box, drum and bag for in store collection



Postage paid shipping box for collected batteries / Hazardous good transport drum / Sticker



Since mid-2013, a fireproof box for visibly damaged or heated lithium batteries, as well as lithium batteries originating from model building, has been made available to collectors for a deposit of CHF 100. Each layer of batteries is to be covered with the supplied PyroBubbles®.

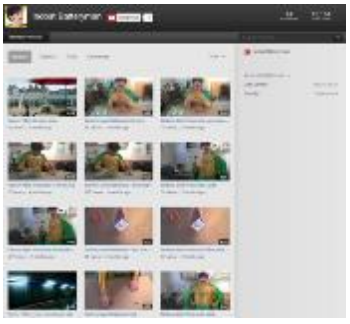
- Battery Bags in all households: In June 2013, battery bags were distributed by mail to every Swiss household.

- **Campaigns:** To achieve the 80% collection target, for which no deadline has been set, INOBAT has been intensifying awareness-creation campaigns aimed at both end-users, in particular younger people (15-35) identified as 'heavy users', and retailers. INOBAT notes that – after a certain delay – campaigns lead to a temporary increase of 5% in collection and must be continually repeated to prevent rates from falling. INOBAT campaigns always use humour:

  - **'Battery-Man'**, 2012 to 2015: The iconic and ironic 'Battery-Man' character is at the centre of the campaign. Battery-Man visits mostly smaller municipalities (below 10,000 inhabitants) throughout Switzerland on a tour bus. The aim of the campaign is to raise awareness among the general public and especially among high school students. The campaign is supported by humorous videos (YouTube) depicting Battery-Man in his efforts to promote battery recycling and a Facebook page (with quite a following). In 2013, the Battery-Man campaign continued with TV commercials (new spot 'burglar'). A 2014 spot shows Battery-Man preventing some of the '30 million batteries that end in the waste bin' from doing just that. The commercials are accompanied by Switzerland-wide poster campaigns near stations and in the vicinity of large shopping centres. **In summer 2015 TV commercial 'Sound for Heroes' encouraged the public to propose music to be added to the Battery Man Summer Playlist (on Spotify).**

  - **'Keine Ausreden'** (No excuses), 2008 – 2011, featured a game for mobile phones that was downloaded 300,000 times.

  - **'Unpassend'** (inappropriate), 2002 - 2007 (link)



2015

- **Schools:** With support from the Federal Office for the Environment, INOBAT develops and regularly revises learning modules with educators about the lifecycle of batteries, with emphasis on recycling.

Consumer awareness and disposal behavior

In late 2008, the Federal Office for the Environment commissioned INOBAT to carry out a two-year survey (2009/2010) which found that 65% of the population considered it very important to dispose of waste batteries correctly.

INOBAT later noted that 98% of Swiss are aware of the need to separately dispose of batteries, while 90% claim to dispose of batteries separately. However, 30 million batteries, or 25% of the around 120 million separately sold batteries reported as placed on the market, still end up in regular household waste, according to INOBAT estimates.

In June 2013, a survey organised in conjunction with INOBAT's infobus campaign found a good awareness of the need for separate disposal of waste batteries. However, 25% of respondents were unsure about where to return batteries. Future campaigns will therefore focus on this aspect.

Accuracy of reporting

POM reports of separately-sold batteries to INOBAT are broken down into seven chemistries. Batteries in EEE are reported to the WEEE organisation and are not broken down by chemistry. The WEEE organisations pass weight data on to INOBAT. In its 2013 annual report INOBAT notes that batteries counted as 'industrial batteries' are either defined as such or are all batteries with a weight above 1 kg.

Free-riders: The legal obligation for producers of separately sold batteries ensures a high degree of compliance. While the financing aspect of separately sold batteries is strictly regulated, this is not the case for WEEE (and integrated batteries): WEEE organisations operate on a voluntary basis without a mandatory financing mechanism. Though a take-back obligation exists for EEE producers, there are no legal obligations to report volumes placed on the market to a central authority. In 2010 and 2011, the weight of batteries placed on the market in EEE was about 17% of total POM, which is comparatively low (data from other countries suggest 30% to 40% of all batteries are placed on the market in EEE). This may explain the relatively low per capita volume of batteries placed on the market (450 g) in Switzerland (Denmark, France, Germany, Ireland and UK all have rates above 500 g per capita).

Collection reports must be equally split into separate chemistries. Monitoring can be done effectively, as essentially all batteries are treated at BATREC in Switzerland.

UNITED KINGDOM

Key points

- The **Waste Batteries and Accumulators Regulations** of April 2009 require only 'large' producers (POM > 1 tonne) to finance waste battery management, and only retailers selling more than 32 kilos of batteries annually are required to take back waste batteries. Producers comply through approved compliance organisations ('Battery Compliance Schemes'- BCS) which must achieve collection targets increasing by 5% annually from 25% in 2012 to 45% in 2016. BCS' are free to choose how they collect batteries but must 'co-operate' to ensure that waste batteries are picked up from local authorities and obligated retailers. About 450 'large' producers currently comply through the five approved organisations: BatteryBack, Valpak, Budget Pack, ERP UK and Repic eBatt.

- The collection rate increased from 10% in 2010 – the first 'compliance period' for battery collection organisations – **to 36% in 2014.** However, the collection rates may be disputed as the weight of lead 'portable' batteries collected has been multiple (up to five times) of lead portable batteries POM. **The collection rate of all other chemistries has increased from a 5% in 2013 to 11% in the first half of 2015. Assuming a plausible scenario in which all lead batteries POM are collected (return rate 100%) the 2014 collection rate would be 15%.**

- **In August 2015, three years after consultation began, the Department for Environment, Food and Rural Affairs (DEFRA) announced that a 4kg weight threshold will be applied to portable batteries from 2016 by way of official guidance, down from currently 10kg. The lower threshold is expected to result in additional collection and processing costs of GPB 33 million over 10 years.**

- The ample availability of lead-acid batteries prevents the organisations from implementing awareness creation and collection programmes as it makes them uneconomical. Collection of non-lead portable batteries could be increased by clearer definitions, stricter enforcement or increasing market transparency to enable producers to make an informed choice when selecting a organisation. Alternatively, the issue could be addressed by restricting the right of each organisation to choose how it collects batteries, namely by mandatory participation of organisations in a central coordination or measureable requirements regarding awareness creation and collection point density.

Regulatory parameters for compliance organisations

The **Batteries and Accumulators Regulations** S.I. 2164/2008 transposed the placing on the market provisions (hazardous substance restrictions, removability of batteries from WEEE, and labelling) of Batteries Directive 2006/66/EC. In August 2014, a consultation paper on the 2015 amendment of the Regulations (transposing Directive 2013/56/EU) points out that due to shorter lifetimes of Ni-Cd substitutes, their economic lifetime cost to consumers are likely to be higher by 10%-20%. **In mid-2015 it was announced that official guidance would revise the definition of batteries that are 'hand-carriable' down from 10kg to 4kg, effective from 2016. Additionally, proposed replacement Producer Responsibility Regulations in September revise the operational plan requirements for compliance organisations and individual compliers.**

The **Waste Batteries and Accumulators Regulations** of April 2009 (S.I. 890/2009) introduced the producer responsibility provisions. The first compliance period (of one year) began on 1 January 2010. Prior to these regulations, producers were not responsible for the management of waste batteries.

Both Battery Regulations notably do not contain provisions regarding industrial batteries (except for their definition).

Roles and responsibilities in waste portable battery collection

- **Large producers** (POM > 1 tonne) must join a Battery Compliance Scheme (BCS) through which they must finance collection, treatment, recycling, information for consumers, the monitoring of the environment agencies and the compliance scheme's service fees. Small producers only have registration and reporting obligations and are not required to join a BCS.

- **Compliance organisations** ('Battery Compliance Schemes') are free to choose how they collect batteries but must 'co-operate' to ensure that waste batteries are picked up from local authorities and those retailers that are obliged to take back waste batteries. BCS' can contract direct with local authorities or distributors or must respond to their requests. BCS' must provide information to end-users about collection facilities etc.

- Each BCS must achieve **collection targets** which increase by 5% annually from 25% in 2012 to 45% in 2016. BCS' must report annually by 31 May on achievement of the targets, supported by battery evidence notes. BCS' who significantly over- or under-collect could have their approval withdrawn.

- **Retailers** selling more than 32 kilos of portable batteries per year must take back waste batteries free of charge from end-users. They must display posters informing end-users about separate collection at their outlets.

- **Local authorities** may voluntarily collect waste batteries at civic amenity sites or by kerbside collection. Battery compliance schemes are not responsible for financing councils' collection activities.

Requirements on compliance organisations

There are no requirements regarding schemes' legal form, ownership, for-profit objective or financial disclosure. Schemes must provide an operational plan annually to the Environment Agencies. The plan must cover the following three years and a BCS must continue to meet the approval criteria, including

- proof of sufficient financial resources and technical expertise to deliver its operational plans over a three year period
- details of its proposed membership and an explanation of how the obligations of its prospective members relate to the collection arrangements put in place
- details for meeting obligations regarding publicity
- details of what reasonable arrangements it will make for accepting batteries from retailers, local authorities and other economic operators and waste collection authorities.

Approval costs are high: GBP 118,000 (EUR 132,455) annual 'subsistence charge', plus GBP 680 (EUR 763) per member. These fees should cover all costs of the Environmental Agencies associated with battery compliance, except costs for enforcement actions against free-riders.

Development of compliance organisations

The single or competing compliance organisations approach was a key issue in stakeholder consultations in late 2007: while EEE producers and existing WEEE and packaging compliance schemes largely advocated a multi-organisation approach, the responsible government departments BIS (then BERR) and DEFRA questioned the multi-organisation approach as 'a proliferation of schemes can be confusing to producers and [present] a risk that targets are not met'.

The single organisation approach was supported by some battery producers (Varta, Energizer) as multiple organisations could make the crucial awareness-creation process more complex. Varta also called for an independent and effective coordinating body should a multi-scheme approach be chosen. LARAC, which represents recycling officers of 400 local authorities, also supported a single national compliance organisation.

In summer 2008 it was decided to opt for multiple organisations (albeit with high annual statutory charges that limit their number) without a clearing house to 'provide producers with choice, and probably … lower costs as a result of competition.'

By the 31 May 2009 deadline, eight organisations had applied for approval as Battery Compliance Schemes (BCS). For the compliance periods 2010 and 2011, the Environment Agencies approved six organisations. For 2012, five organisations were approved, through which about 490 large producers[186] currently comply:

- **BatteryBack**, a joint-initiative between **WasteCare**, the parent company of WEEE compliance organisation 'WeeeCare', and **Veolia ES** which also operates a WEEE compliance organisation. Its members include Duracell, Hewlett-Packard, Philips, Toshiba, Procter & Gamble, Sony and retailers Tesco, ASDA, John Lewis and Morrisons. The membership of these large retailers gives BatteryBack access to the waste portable batteries which are collected via supermarkets and other large stores.

- **Valpak**, set up by the packaging industry chain as a collective packaging compliance organisation in 1997, it also operates a WEEE compliance organisation. Retail members include Ikea, Sainsbury's and B&Q, producer members include Acer, Brother, Energizer, IBM, Johnson & Johnson, Kenwood, Lenovo, Motorola and Panasonic.

- **Budget Pack Ltd**, which has operated a packaging compliance organisation since 2003. Its members including Black & Decker, Daikin, Kodak, Olympus, FujiFilm, Nikon and Office Depot.

- **ERP UK**, founded as a pan-European WEEE compliance organisation by Braun, Electrolux, Hewlett Packard and Sony. Duracell, the UK's largest supplier of portable batteries, joined ERP for the 2010 compliance period, but moved to BatteryBack for the 2011 period.

- **Repic eBatt**, a sister organisation of the producer-initiated WEEE compliance organisation REPIC which is supported by AMDEA (the Association of Manufacturers of Domestic Appliances) and Intellect (the Information Technology, Telecommunications and Electronics Association). Large members include Hitachi, Hoover, JVC, LG, Sanyo and Sharp.

In addition to the 490 large producers (July 2012), 1017 **small producers -** who represent a combined 1% of POM and are not required to finance waste batteries management - are registered with and report volumes to the Environment Agencies[187]. In the context of the Government's **Red Tape Challenge** initiative, there are discussions to also exempt small producers from the registrations and reporting obligations as a result of the.

[186] As of July 2013. Registered producers are published on EA's public register - **batteries**

[187] Note: There are also 298 registrations for industrial and 112 for automotive batteries.

Clearing for over- and under-collection

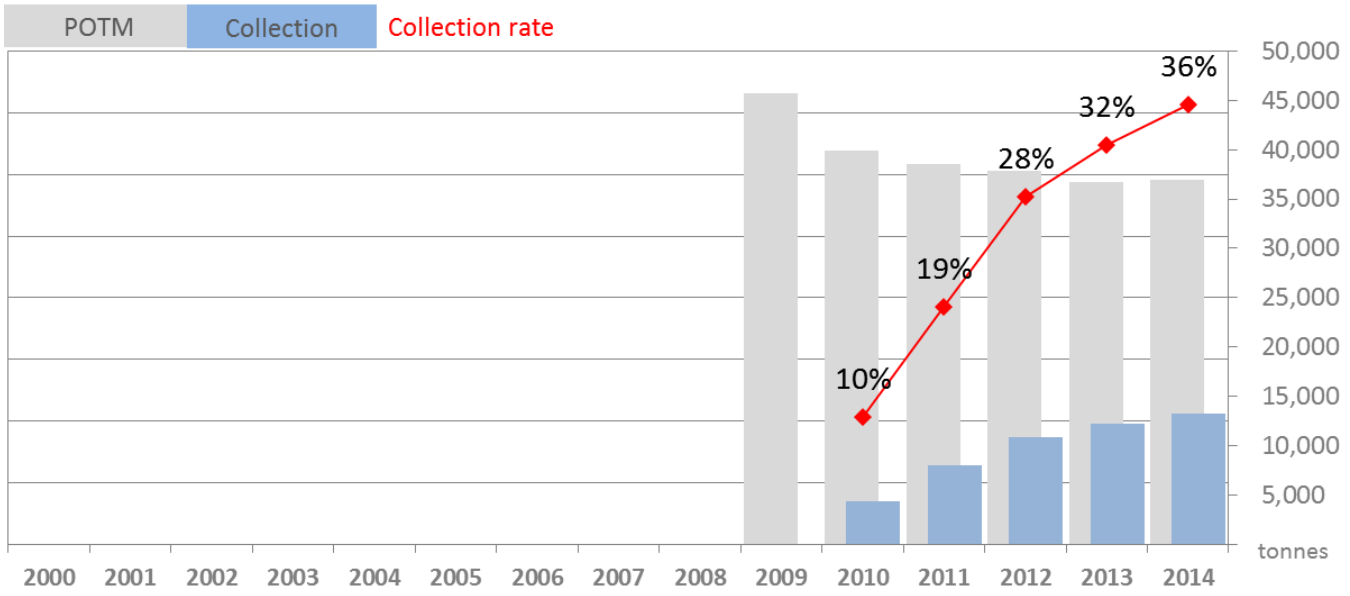
All collected batteries must be handed to Approved Battery Treatment Operators (ABTOs) and/or Approved Battery Exporters (ABEs). ABTOs and ABEs record WBA volumes received on the Environment Agency's IT system in the name of the compliance organisation which delivered the batteries. Once recorded, evidence may be traded between organisations.

Interface with WEEE organisations

All battery organisations are either also WEEE organisations or are associated with WEEE organisations, which facilitates coordination of activities between the two waste streams.

Collection results

The collection rate increased from 10% in 2010 – the first 'compliance period' for battery collection organisations – **to 36% in 2014. The rate of growth of the collection has been slowing from 80% in 2011, 37% in 2012 to 12% and 9% in 2013/4, while POM decreased slowly at -1 to -3% until 2013 and slightly increased (+1%) in 2014.**



However, the collection rate is disputed as the weight of lead 'portable' batteries collected has – since 2011 - a multiple of lead portable batteries POM (since 2012: 3 to 5 times). **The collection rate of all other chemistries has increased from a low of 5% in 2013 to 11% in the first half of 2015.**

Assuming a plausible scenario in which all lead batteries POM are collected (return rate 100%) the 2014 collection rate would be 15%. The lead share in POM is higher than in most countries (UK: until 2012 8%; From 2013: about 6%).

Collection rates UK, current year basis	***2010***	***2011***	***2012***	*2013*	***2014***	***2015 H1***
All chemistries	11%	21%	29%	33%	**36%**	**46%**
Lead	55%	179%	295%	478%	**423%**	**476%**
All chemistries except Lead	7%	6%	6%	5%	**8%**	**11%**
All batteries but assuming plausible lead collection volume: Lead collected = Lead POM	**15%**	**14%**	**14%**	**11%**	**15%**	**18%**

Drivers affecting the collection rate

Availability of collection points and use of collection channels

There are an estimated 50,000 waste portable battery collection points in the UK, or one for every 1,250 residents.

In 2010, organisations were confident of reaching the interim targets through retail take-back, existing municipal sites and schools but acknowledged that other collection possibilities would have to be explored for 2012 and beyond. Local authorities' involvement is considered crucial to increase collection, notably by providing kerbside collection and promoting collection in schools.

Number of collection points and share of collected batteries, estimate 2011:

Collection point host	***Number of collection points***	***Share of total waste battery collection***
Retailers serviced by organisations	45,000	20%
Municipalities	1,000	10%
Schools	1,500	3%
Companies		65%*
WEEE dismantlers		2%

Source: Own estimates

** main source of lead acid batteries*

Consumer awareness measures

Supporting legal requirements

Battery organisations must provide information to end-users on

- the reasons why batteries should not be disposed of with ordinary waste;
- the collection and recycling facilities available to end-users;
- the meaning of the crossed-out wheeled bin symbol and the chemical symbols for mercury, cadmium and lead.

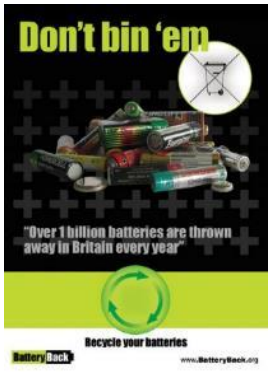
BIS Guidance notes that BCS' have the flexibility to design their publicity in ways which complement the collection methods that they are using. Organisations may also wish to co-operate on publicity to ensure a consistent and coherent message to consumers, and to consider working with local authorities.

Distributors/retailers must display **posters** informing end-users about separate collection at or near their outlets.

Batteryback

WasteCare has been running BatteryBack as a national recovery service for waste portable batteries since July 2008. Batteries are collected from retailers, offices, schools and local authorities. WasteCare already works with Veolia on WEEE collection. It aims to provide over 80,000 collection points over the next few years. By the end of 2008 it operated around 1,500 collection points including points hosted by retailers Currys, PC World, ASDA, Boots and TESCO.

- **Collection containers:** BatteryBack has **over 30,000 (2014) collection points** in hundreds of ASDA, Boots and TESCO stores all over the UK.



EcoSurety (Previously Budget Pack)

Bristol-based producer compliance scheme EcoSurety (previously Budget Pack Environmental) provides a battery collection and recycling service.

- **Collection containers:** In Mid-2013 Budget Pack released a battery collection box.

ERP

- **Collection containers and consumer awareness: ERP educational videos on Youtube inform about battery collection and recycling processes and provide guidance directed at various parties. Signature red battery recycling boxes:**

Valpak

- **Collection containers:** Valpak found that free standing collection tubes were more effective than cardboard boxes.

- **Campaigns:** The Recycle-more campaign provides information, help and advice on all aspects of recycling within the home, schools and workplaces and conducts competitions in various regions with prizes on offer. The website is accompanied by a Facebook page.
    - Since 2011, Valpak has organised campaigns in schools.
    - In mid-2012, Valpak launched free 'Regional Forums for UK businesses' across the UK, which include workshops designed to keep businesses up-to-date with ever-changing environmental legislation.
    - Valpak supports charities, raising money for Warwickshire Wildlife Trust, The Elisabeth Svendsen Trust for Children and Donkeys, Action 21's Sustainability Garden and Kamla Foundation - sustainable water management solutions in Tamil Nadu, India.

Municipalities

Many local authorities and other voluntary collectors purchase durable battery collection containers from manufacturers such as RS Fabrications and Merlin Industrial.



Consumer awareness and disposal behaviour

In December 2010, **ERP** announced the results of a survey on battery recycling awareness in the UK which found that

- nearly half (49%) of the respondents had never separately disposed of batteries;
- 45% were unaware of any battery collection points near to where they live or work;
- almost twice as many people over 55 (52%) have disposed of batteries separately, compared with 16-24 year olds (27%);
- the Welsh were the keenest recyclers with 58% of the population having separately disposed of batteries, whilst in Northern Ireland less than 30% had done so.

A July 2010 survey commissioned by **ERP** found that battery recycling awareness was particularly low among 11-16 year olds: 58% of the respondents had never separately disposed of batteries while 38% did not know that batteries could be recycled.

Data accuracy

The Environment Agencies publish quarterly breakdowns of the overall POM and collection volumes into 3 chemistry groups (Lead acid, NiCd, Other).

The Agencies and Industry Batteries Operational Liaison Group (**AIBOLG**) meets[188] quarterly to discuss issues arising from the implementation of the Waste Batteries Regulations. AIBLOG is comprised of two representatives from battery organisations, four from approved battery treatment operators or exporters and six from the Environment Agencies.

POM

Organisations typically **audit** battery declarations of a share of their members annually based on risk profiling. In 2011, 27 large producers representing 55% of portable batteries POM were audited. In 2012, 33 producers representing 11% of POM were audited. In 2013, the Environment Agency audited all organisations.

The Environment Agency is not funded to actively identify **free-riders** but investigates when made aware of specific companies. As regards small producers, which represent 1% of the total market, the Environment Agency takes a risk-based approach. An EA project targeting WEEE free-riders also covers compliance of batteries in EEE. A hotline number is provided (0800 023 2090) that allows callers to report details of suspected free-riders anonymously.

Collection

Battery collectors must hand over waste batteries to Approved Battery Treatment Operators (ABTOs) and/or Approved Battery Exporters (ABEs). ABTOs and ABEs record volumes received on the Environment Agency's IT organisation in the name of the compliance organisations which delivered the batteries. Once recorded, schemes may sell the evidence to other schemes.

The publication of 2010 collection data was delayed by almost a year due to the lack of an **audit** trail for data from one of the organisations which subsequently ceased to act as a BCS. In 2012, 17 ABTOs and ABE responsible for 46% of portable batteries evidence were audited (2011 9 sites representing 52%). The number of approved battery treatment sites fell from 35 in 2012 to 20 in 2013 (the volumes handled by the no longer approved sites were small).

Lead share

The disproportionate amount of **waste lead acid batteries** points to the shortcomings of the definition of batteries whose category cannot be distinguished as such at the time of delivery to the ABTOs/ABEs.

In August 2015, 3 years after a first proposal was launched, the Department for Environment, Food and Rural Affairs (DEFRA) announced that official guidance will revise the definition of 'hand-carriable' down from 10kg to 4kg. Any battery weighing 4kg or less will be classed as portable, and any battery over 4kg will be classed as industrial. A battery under 4kg may still be industrial if it is designed exclusively for industrial use.

The lower threshold was expected to result in additional collection and processing *costs* of GPB 7.8 million over 10 years. This estimate was revised up to GPB 33 million in November 2015. *Benefits* of the 4 kg threshold are estimated at GBP 0.3 million over 10 years, arising from carbon savings (as less virgin raw material is required as a result of recycled metals). The impact assessment did not monetize other environmental benefits (e.g. 'from metal leaching into soil at landfill or into the atmosphere from incineration, although the risk of leaching from modern landfill sites is generally low').

[188] AIBOLG meeting minutes are available on EA website **here.**

Potential for improving collection rates

The easy availability of lead-acid batteries and the facility to use them towards the collection target prevents the organisations from implementing awareness creation and collection programmes as it makes them uneconomical.

The accuracy of the collection rate and the collection of non-lead portable batteries could be increased by

- clearer definitions of portable and industrial batteries;
- stricter enforcement;
- Increasing market transparency (e.g. by requiring organisations to publish the chemistries they collect) to enable producers to make an informed choice when selecting a organisation.

Alternatively, the issue could be addressed by restricting the right of each organisation to choose how it collect batteries, namely by

- requiring mandatory participation of organisations in a central coordination body, which would also provide a single interface between organisations and local authorities; and
- imposing on organisations measureable requirements regarding awareness creation and collection point density.

PORTABLE BATTERIES LEGISLATION ELSEWHERE

EU neighbours

Belarus

The 2007 'Law on Waste Management' empowers State Ministers to apply producer responsibility obligations to products that generate waste, and from August 2012 an implementing Decree applied an eco-fee of 1.5% of the sales price on primary batteries.

Bosnia-Herzegovina

An amendment to Bosnia's Waste Management Law of 2009 calls for implementing regulations on certain waste streams, including WEEE and waste batteries by 2010. However, there is as yet no implementing regulation as regards waste portable batteries. The Federal Waste Management Plan 2012-2017 foresees a waste battery regime in which municipalities play a central role in the separate collection of waste batteries while producers finance collection and treatment via the environmental fund.

Macedonia (FYR - Former Yugoslav Republic of Macedonia)

Macedonia transposed Batteries Directive 2006/66/EC with effect from January 2012: Producers are incentivized to set up or join a licensed compliance organisation in order to be exempt from an environmental fee of around EUR 2,025 per tonne of batteries placed on the market. Retailers must take back waste batteries and municipalities must co-operate with producers and collective organisations in the setting up of collection points and informing the public about collection locations. Nula Otpad (Zero Waste), formed in 2012 as a non-profit organisation, was licenced as the first compliance organisation under Macedonia's battery management law on 26 October 2012.

Montenegro

EU accession negotiations opened in June 2012. So far, the Montenegrin WEEE and Waste Batteries Regulations only partly transpose the equivalent EU Directives. The Law on Waste Management of December 2005 designated WEEE and waste batteries as 'Special Wastes', which must be collected separately and for which producers must pay a Special Waste Management Fee. Since 1 January 2010 producers and importers have had to report quarterly volumes of electronics, batteries and packaging placed on the market to the Agency for Environmental Protection. From the date of Montenegro's accession to the EU, producers will have to pay the special waste management fee (e.g. EUR 140 per tonne of ITC equipment). The fee will accrue to the state budget.

Russia

Since January 2015, an amendment of the Federal Law on Waste Production and Consumption has obligated producers and importers to independently manage packaging and product waste, including from batteries, or pay an environmental fee. In October 2015, the Environment Ministry announced a de facto exemption reporting and fee payment obligations for the first nine month in 2015 as some implementing regulations remain yet to be published.

Turkey

The 2004 Batteries Regulation requires producers to collect 80% of NiCd and HgO batteries placed on the market and 40% of all other portable batteries by 2009 (collection results in 2009 showed the target was missed by a factor of around 10). A new Waste Management Law, currently in drafting, does not bring substantial changes to the existing producer responsibility regulations.

There is one collection organisation for portable batteries, TAP, set up by the Portable Battery Manufacturers and Importers Association of the same name in 2004. TAP has around 350 members.

Ukraine

Waste batteries legislation has been driven by industrial policy with the objective of protecting local production, in particular of lead batteries. Batteries Directive 2006/66/EC is notably absent from the pre-Maidan government's schedule for implementing EU legislation. 1996 Cabinet Orders on the collection and reprocessing of spent lead-acid batteries aimed to establish a closed-loop production facility for lead-acid batteries run by partly state-owned company ISTA.

Americas

Argentina

On a national level there is as yet no legislation regulating the take-back of batteries. In March 2013 a Bill advocating EPR on waste batteries was introduced to the Senate. The Bill would effectively hold manufacturers of primary and rechargeable batteries (containing hazardous substances over certain thresholds) responsible for their end-of-life management.

Brazil

The EPR and reverse logistics-related provisions of National Waste Law No. 12.305/2010 have not yet been implemented with regard to batteries. On a state level, Sao Paulo's Law 12.300 of March 2006 and implementing Resolution SMA 38/2011 of August 2011 require producers and importers of batteries to establish reverse logistics programmes for their end-of-life batteries.

Canada

There is no federal legislation mandating the collection and recycling of waste batteries in Canada. However, four of the 10 provinces have EPR-based waste portable batteries legislation in place: The schemes in British Columbia, Manitoba and Quebec are operated by Call2Recycle, whereas Ontario manages waste batteries through its Orange Drop scheme (limited to single-use batteries). Ontario collected around 61 g of single-use batteries per capita of the state population in 2012, Call2Recycle recycled about 15 g per capita of rechargeable batteries in all of Canada.

Colombia

The legal basis for producer responsibility was introduced in Hazardous Waste Law 4741 in 2005. A Resolution of July 2010 by the Ministry of Environment subjected all loosely sold batteries and accumulators to mandatory take-back programmes.

Costa Rica

Decree 35933-S-2010 of 5 May 2010 on the mandatory take-back of certain WEEE includes laptop and cell-phone batteries in its scope. Separately sold batteries and accumulators are not yet subject to mandatory take-back requirements: A draft implementing regulation on 'Special Waste Management' (No. DRS-IC-883/12), released in December 2012, subjects Cadmium and Lithium batteries to EPR programmes. A new Framework Waste Law covering special wastes is currently being drafted.

Ecuador

A 2013 a Ministerial Agreement requires manufacturers and importers of batteries of certain chemistries which can be removed from EEE to properly treat expired batteries.

USA

While there is no federal legislation requiring the take-back of waste batteries by retailers or producers, 9 of the 51 states, including California, New York State and Florida, have take-back requirements on some batteries in place, mostly on rechargeable batteries only. In 1994, non-profit public service organisation 'the Rechargeable Battery Recycling Corporation' (RBRC) set up Call2Recycle. Call2Recycle takes back waste rechargeable batteries from retailers in California and New York and operates such programmes on a voluntary basis throughout much of the US and Canada. RBRC's board members include representatives from Sanyo, Black & Decker, Varta, Panasonic and Sony. In November 2011, Four of the largest battery manufacturers (Duracell, Energizer, Panasonic and Rayovac) incorporated a Non-profit organisation 'the Corporation for Battery Recycling' (CBR) with the mandate to establish a nation-wide voluntary battery take-back programme. In mid-2014 the CBR, in collaboration with the National Electrical Manufacturers Association (NEMA - whose members include Duracell, Energizer and Panasonic), the Rechargeable Battery Association (PRBA - which represents many IT manufacturers) and Call2Recycle released a 'model' draft act to be used as a template for the development of EPR-based state legislation on portable batteries.

Asia

China

The Waste Battery Pollution Control Policy of October 2003 stipulates collection of rechargeable batteries (nickel-cadmium batteries, nickel hydrogen batteries, lithium-ion batteries, lead acid batteries) and button cells and makes producers responsible for recycling. Retailers of such batteries should provide take back of waste batteries. However, a central collection organisation is not deemed necessary as batteries have reached low mercury levels. T**his appears to have changed as the Government is considering a waste policy now also for non-rechargeable batteries.**

Japan

As one of the product groups regulated under the revised Law for Promotion of Utilization of Recyclable Resources (LPEUR) of 2000, portable rechargeable batteries have been subject to labelling and take-back obligations since April 2001. There are no collection targets.

South Korea

Since 2005 the EPR Organisation extended to batteries in personal computers, audio equipment, mobile phones and since January 2008 to separately sold alkali manganese, Ni-Cd, mercury-containing, oxidized silver, primary lithium batteries, as well as and such batteries contained in certain electronics including calculators, notebooks, razors, phones, cameras and watches. The Government announces annually collection target for producers who must submit an individual or collective implementation plan to implementation agency. Fines are issued for underachievement of the targets.

Republic of China (Taiwan)

Since 1998 producers have been obligated to pay 'Recycling Fees' into the Environment Protection Agency's Recycling Fund, while EPA uses the funds to pay 'Recycling Subsidies' to accredited recyclers. Retailers of batteries, in particular supermarkets, discounters, convenience stores, retailers of mobile phones or cameras must collect waste batteries. In addition, municipal mobile waste collection services must collect batteries separately. According to EPA, around 5,470 tonnes of waste dry cell batteries were collected in 2008, or around 240 per capita.

ANNEX

Sources

The study's findings rely on primary research of publications by collection organisations (notably annual reports) and national authorities, supported by questionnaires and interviews with representatives from selected organisations.

Austria

Lebensministerium, Government
Umweltbundesamt, Environment Agency
EAK, Coordination centre
CCR Austria, Compliance organisation
ERA, Compliance organisation
ERP Austria, Compliance organisation
Interseroh Austria , Compliance organisation
UFH, Compliance organisation
Saubermacher AG, Waste Management Company

Belgium

IBGEBIM (Brussels), Environment Agency (Brussels)
OVAM (Flanders), Environment Agency (Flanders)
OWD (Wallone), Environment Agency (Wallone)
BEBAT, Compliance organisation
FEE, Waste management association

Bulgaria

Ministry of Environment and Water, Government
EMEPA, Environment Agency
Ecobattery, Compliance organisation
Ecobulbattery, Compliance organisation
Eltechresource, Compliance organisation
Greentech Bulgaria, Compliance organisation
Nooro, Compliance organisation
Nord Recycling, Compliance organisation
Recobat, Compliance organisation
Transins Battery, Compliance organisation
UBA Recycling, Compliance organisation

Croatia

Ministry of Environment and Nature Protection, Government
Eko-Ozra , Compliance organisation (prospective)
Fund for Environmental Protection and Energy Efficiency, Recycling Fund

Cyprus

Ministry of Agriculture, Natural Resources and Environment, Government
AFIS Cyprus, Compliance organisation

Czech Republic

Ministry of Environment, Government
ECOBAT, Compliance organisation
REMA Battery, Compliance organisation

Denmark

Ministry of the Environment, Government
VIRK (battery tax), Government
Environmental Protection Agency
DPA System, Coordination centre
Elretur, Compliance organisation
ERP Denmark, Compliance organisation
RENE AG , Compliance organisation
Returbat, Lead battery organisation
Batteri foreningen, Producer association

Estonia

Ministry of the Environment , Government
EES-Ringlus, Compliance organisation
Elektroonikaromu , Compliance organisation
Probleemtooteregister, Producer register

Finland

Pirkanmaa, Environment Agency
ERP Finland, Compliance organisation
RECSER OY, Compliance organisation

France

MoE, Government
MoI, Government
ADEME, Environment Agency
RegistreDEEE, Producer register
Corepile, Compliance organisation
Screlec, Compliance organisation

Germany

BMU, Government
UBA, Environment Agency (Federal)
Batteriemelderegister, Producer register
GRS , Compliance organisation
CCR Rebat, Compliance organisation
ERP Germany, Compliance organisation
Ökorecell, Compliance organisation
ZVEI, Producer Association

Greece

Ministry of Environment, Government
E.O.AN., Government agency overseeing separate waste streams
AFIS, Compliance organisation

Hungary

KVVM Ministry of Environment, Government
OKTV, Environment Agency
OHÜ, National Waste Management Agency
Customs Association, Government
CCR Rebat Nonprofit Kft , Compliance organisation
RE´LEM Nonprofit Kft, Compliance organisation
Re-bat Nonprofit Kft, Compliance organisation

Iceland

Ministry for the Environment , Government
Icelandic Recycling Fund, Recycling Fund

Ireland

Department of the Environment, Community and Local Government
EPA, Environment Agency
ERP Ireland, Compliance organisation
WEEE Ireland, Compliance organisation
WEEE Register Society, Producer register

Italy

MoE, Government
Registro Pile e Accumulatori, Producer register
CDCNPA , Coordination centre
Remedia, Compliance organisation
RAEcycle, Compliance organisation
ERP Italia,
Ecoped, Compliance organisation
CCR Italia, Compliance organisation
Ecodom, Compliance organisation
EcoR'it, Compliance organisation
Cobat, Compliance organisation
ANCI, Association of regions
ANIE , Producer association
ISPRA Institute for Protection and Environmental Research

Latvia

MoE, Government
Green Dot Latvia , Compliance organisation
Latvia Green Electronics , Compliance organisation
ZAĻĀ JOSTA , Compliance organisation
ZAĻAIS CENTRS , Compliance organisation
BAO , Waste management company

Lithuania

Ministry of Environment, Government
Aplinkos Apsaugos Agentūra, Environment Agency
EEPA Collective system, Compliance organisation
GIA System , Compliance organisation
Zalvaris, Compliance organisation
EMP, Waste management company

Luxembourg

Administration de l'Environnement, Division des Déchets
SuperDrecksKëscht , Waste collection program
Ecobatterien, Compliance organisation

Macedonia (FYR)
MOEPP, Government

Malta
MEPA, Environment Agency
WasteServ Malta, Waste collection programme
GreenPak, Compliance organisation (potential)

Montenegro
EPA Montenegro, Environment Agency

Netherlands
SenterNovem, Government
Stibat, Compliance organisation
ARN, Lead battery organisation

Norway
Climate and Pollution Agency, Environment Agency
Batteriretur AS, Compliance organisation
Rebatt AS, Compliance organisation
EE Registreret, WEEE coordination centre

Poland
MoE, Government
GIOS, Environment Agency
NFEP, Recycling Fund
REBA, Compliance organisation
Biosystem, Compliance organisation
ERP Batteries Poland Sp. z o. o., Compliance organisation
Auraeko, Compliance organisation
CCR Polska, Compliance organisation

Portugal
Apambiente, Environment Agency
ANREEE, Producer register
Ecopilhas, Compliance organisation
AMB3e, Compliance organisation
ERP Portugal, Compliance organisation

Romania
Ministry of Environment and Climate Change
ANPM, Environment Agency
CCR Rebat, Compliance organisation
ECOTIC BAT, Compliance organisation
RECOBAT Plus, Compliance organisation
RoRec, Compliance organisation
SNRB, Compliance organisation
SNRB, Compliance organisation

Serbia
Ministry of Environment and Spatial Planning
SEPF, Recycling Fund

Slovakia
Ministry of Environment, Government
Slovak Environmental Agency, Environment Agency
Recycling Fund, Recycling Fund
INSA, Battery collection programme
Asekol, Compliance organisation
Elektrorecyling, Compliance organisation
Natur Elektro, Compliance organisation
SEWA , Compliance organisation
Mach Trade , Waste management company

Slovenia,
MoE, Government
ZEOS, Compliance organisation
Interseroh, Compliance organisation
Slopak, Compliance organisation

Spain
Registro P&A, Producer register
OfiPilas , Coordination centre (voluntary)
Ecopilas , Compliance organisation
El Kretsen, Compliance organisation
ERP Spain, Compliance organisation
Asimelec, Producer association

Sweden
MoE, Government
Naturvardsverket, Environment Agency
EE- & Batteriregistret, Producer register
Batteriinsamlingen, Battery collection programme
El-Kretsen , Compliance organisation
Avfall Sverige, Waste management association
SKL, Association of regions

Switzerland
BAFU, Government
INOBAT, Compliance organisation

Turkey
TAP, Compliance organisation

UK

Department for Business, Innovation & Skills
Environment Agency
BatteryBack, Compliance organisation
Budget Pack , Compliance organisation
ERP UK, Compliance organisation
Repic eBatt, Compliance organisation
Valpak, Compliance organisation

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